1974 Report of

RANDOM SAMPLE EGG PRODUCTION TESTS

United States and Canada

Two-Year Combined Summary, 1972-73 and 1973-74

Range Group Rankings, 1973-74

ARS-NE-21-2

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ANIMAL IMPROVEMENT PROGRAMS LABORATORY

AGRICULTURAL RESEARCH SERVICE • U.S. DEPARTMENT OF AGRICULTURE

PREFACE

Egg production tests are designed to provide poultrymen, hatcherymen, and breeders with a reliable guide to the performance of poultry stocks offered for sale. This publication contains information on many egg production traits that are of economic importance to the trade. The data were compiled from the records of official Random Sample Egg Production Tests conducted in the United States and Canada. The data resulting from these tests have been analyzed statistically by the Animal Improvement Programs Laboratory, Animal Physiology and Genetics Institute, Agricultural Research Service, USDA, Beltsville, Md.

The publication of this report is based on recommendations of the National Committee on Random Sample Poultry Testing and the Council of American Official Poultry Tests. The information was compiled by the Poultry Improvement Staff, Animal Improvement Programs Laboratory, Agricultural Research Service, from data furnished by Test supervisors.

The publication of this report does not imply approval or endorsement by the U.S. Department of Agriculture of any of the stocks mentioned.

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TABLES

This report is divided into four sections:

1. A 2-year combined summary of the data obtained in the 1972-73 and 1973-74 Random Sample Egg Production Tests. These data were treated by acceptable statistical procedures that allow the reader to compare directly the stock entered in the various egg production tests in the United States and Canada.

2. An explanation of statistical procedures that were used in computing the regressed means and confidence limits of egg production traits evaluated in the 2-year combined summary.

3. A range group ranking for stock that was entered in 1973-74 Random Sample Egg Production Tests. The ranking shows the performance of each stock by traits compared with that of other stock in the same test.

4. List of stocks entered in 1973-74 tests and some of the management conditions at the test during the 1973-74 test year.

TWO-YEAR COMBINED SUMMARY FOR TEST YEARS 1972-73 and 1973-74

Entries in the various tests start with a random sample of hatching eggs or chicks of the stock to be tested. Samples are drawn according to prescribed methods to ensure that each entry is typical of the stock it represents. All entries within a test are treated alike with respect to housing, feeding, management, and disease control in order to avoid differences in performance that would be due to environment.

All tests are conducted according to these basic principles. However, even the most carefully designed and conducted tests are influenced by errors of two kinds. The first kind of error is the chance deviation or unavoidable "sampling error" made when a small sample of eggs or chicks represents an entry. The other kind of error is due to uncontrolled or unknown environmental differences between entries that occur in spite of all efforts to treat all entries within a given test as nearly alike as possible. The differences between the results for two entries in a single test for a single year may be due to these chance variations rather than to a real difference in the performance capabilities of the two stocks. The effect of such errors in comparing stocks can be materially reduced by basing comparisons on the combined results of several tests over two or more years.

If all entries compared were entered in the same tests in both years, the simple averages could be compared directly without adjustment. However, differences among tests and between years and those caused by climatic conditions and other environmental factors affect the results. As a consequence, a direct comparison of the test results of two stocks in different tests or in different years may be misleading. Therefore, to present test results in a manner that will allow sound evaluation of all stocks tested, the results were combined, by stocks and by years, and were adjusted by accepted statistical procedures for test and year differences and for variation in amount of information per stock. The results of these computations are published as the "regressed mean" for each trait for each stock that was tested (table 1).

The performance data (regressed means) reported in this summary are derived from the results reported by the individual tests for each of the past two years. It is unlikely, however, that the means for any stock, even though entered in only one test each year, will coincide precisely with the two-year average performance data as published by the test. The variations are due to adjustments for test differences, year difference, the number of tests and of years entered, and the number of replicates per test. These statistical adjustments allow predictions of what the average performance would have been for each stock had all stocks been entered in all tests each year.

The statistical treatment applied to the test data is designed to reduce the influence of nongenetic variations. This cannot be accomplished perfectly, and consequently, estimates or predictions of performance cannot be made with absolute precision. However, reliable predictions, within prescribed limitations, can be made as to whether a difference in the reported performance of stocks represents a real difference in their performance. These predictions involve the use of the confidence limit values that have been computed for each trait or performance factor reported.

A brief explanation of the statistical procedures used in computing the regressed means and confidence limits is provided in the section entitled "Procedures Used for Computing Combined Summary Values."

The following example illustrates the compilation of the two-year combined summary. This and the related explanation will help the reader to use and interpret the data in table 1.

(Illustration of regressed means and 80-percent confidence limits
as they might appear for a few traits)

STOCK CODE	BODY WEIGHT (pounds)		FEED PER POUND OF EGGS PRODUCED (pounds)		EGG WEIGHT (oz./doz.)		LARGE AND EXTRA LARGE EGGS (percent)		ALBUMEN QUALITY (Haugh units)		BLOOD SPOTS			
											1/8 INCH OR MORE (percent)		LESS THAN 1/8 INCH (percent)	
	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS
995	5.6	5.4 5.8	3.02	2.95 3.09	26.0	25.7 26.3	77.5	75.2 79.8	77.9	77.1 78.7	1.1	0.9 1.4	2.7	2.2 3.2
996	4.2	4.0 4.4	2.83	2.77 2.89	25.2	25.0 25.4	71.0	69.0 72.8	80.9	80.1 81.7	0.7	0.6 1.0	1.1	0.8 1.4
997	4.7	4.5 4.9	2.94	2.86 3.02	24.9	24.6 25.2	68.0	65.5 70.3	74.1	73.3 74.9	1.2	1.0 1.4	1.9	1.5 2.4
998	4.0	3.7 4.3	2.84	2.73 2.95	25.3	24.9 25.7	72.4	69.2 75.6	76.6	75.5 77.7	1.0	0.9 1.2	1.5	1.2 1.9
999	4.2	3.9 4.5	2.56	2.47 2.65	25.4	25.0 25.8	70.3	67.6 73.0	83.0	82.3 83.7	0.8	0.6 1.0	1.1	0.7 1.4

*If the confidence limits for two regressed means overlap, the two means are not significantly different at the 5% level.

The range of the confidence limits represents the amount of difference in the performance of two stocks that may be due to chance. If the confidence limits for two regressed means overlap, the two means are not significantly different at the 5-percent level of probability. If the confidence limits for two regressed means do not overlap, the odds are at least 19 in 20 that a real difference exists in the performance of the two stocks.

The use of the above data as a means of evaluating different stocks and traits can be illustrated as follows:

For the trait "Body Weight," the confidence limits of Stock 995 (5.4 to 5.8 lbs.) do not overlap the confidence limits of any of the other stocks. Therefore, Stock 995 has a significantly higher body weight than the others. However, the confidence limits of Stock 996 (4.0 to 4.4 lbs.) overlap the confidence limits of Stock 998 (3.7 to 4.3 lbs.) and Stock 999 (3.9 to 4.5 lbs.). The body weights of these three stocks are, therefore, not significantly different.

Using the trait "Feed per Pound of Eggs Produced" as another example, the confidence limits of Stock 995 (2.95 to 3.09 lbs.), Stock 997 (2.86 to 3.02 lbs.), and Stock 998 (2.73 to 2.95 lbs.) all overlap each other. Thus there is no significant difference in the feed conversion of these three stocks. When comparing the feed conversion of Stock 999 (2.56 lbs.) with that of the other stocks, we see that the range of its confidence limits is from 2.47 to 2.65 lbs. Since this range does not overlap the confidence limits of the other four stocks, Stock 999 has a significantly lower feed conversion than the other stocks listed.

Another example can be shown by using the trait "Albumen Quality." The confidence limits of Stock 995 (77.1 to 78.7) overlap the confidence limits of Stock 998 (75.5 to 77.7). Therefore, there is no significant difference in the albumen quality of these two stocks, even though the regressed mean of Stock 995 is 77.9 Haugh Units and Stock 998 is 76.6 Haugh Units. When Stock 995 is compared with Stocks 996 and 999, we see that the confidence limits of these two stocks do not overlap those of Stock 995. Thus, these two stocks have a significantly higher albumen quality (80.9 and 83.0 Haugh Units, respectively) than the 77.9 Haugh Units of Stock 995. In comparing Stock 995 with Stock 997, the confidence limits do not overlap. In this case, the albumen quality of Stock 997, expressed as a regressed mean of 74.1 Haugh Units is significantly lower than the regressed mean of Stock 995.

The range of the confidence limits will not necessarily be the same for two different stocks that have the same regressed mean. The number of locations in which a stock is entered, the number of replicate pens per location, the number of years entered, and the accuracy involved in adjusting for location and year effects all have a bearing on the range of the confidence limits for each individual regressed mean.

Explanation of Income Figures

The "Income Over Feed and Chick Cost" figures reported in table 1 represent the sales value of the eggs produced and of the hens at the end of the test minus the cost of the chicks and the feed used during the growing and laying periods. These figures may be useful in comparing the overall performance of stocks, but they should not be considered as predictions of "profit" to be obtained under commercial operations. The "income" figures should be reduced by other costs, such as labor, building and equipment depreciation, vaccination, litter, interest, taxes, and insurance, to approximate profits that might be expected under commercial conditions. Surveys conducted among commercial producers indicate that such other costs may range from $1 to $2 per pullet housed.

Although the average chick price is reported for each stock, this value cannot be appropriately used to convert the "Income Over Feed and Chick Cost" figure to an income over feed cost figure. The average chick price shown is a simple unadjusted average of the prices reported by the entrant for his entries in the various tests and is not directly comparable to chick cost included in "Income Over Feed and Chick Cost."

Stocks Should be Compared for all Traits

All traits should be considered when using this report to evaluate the overall performance of the various stocks. The values reported for "Income Over Feed and Chick Cost" represent a composite of several traits, combined as determined by the economic conditions of the areas in which the tests are located. The conditions under which the stock is expected to perform in commercial production may differ from those prevailing at the tests, and such differences should be taken into consideration. For example, a poultryman whose local market pays unusually high premiums for large and extra large eggs should place more emphasis on egg size in his evaluation of stock than poultrymen located in areas where such premiums are not available. The local market preference for brown or white shells should also be taken into account. Traits related to interior egg quality that affect the grade are of greatest importance in areas where prices are based on quality standards.

Each person should study his local needs and conditions and then place appropriate emphasis on the performance traits that are of greatest importance to his situation. A productive and profitable stock for one poultryman under one set of conditions may not fit the needs of another poultryman under a different set of conditions.

Definition of Terms Used and Abbreviations

Stock: A term used to identify a specific breeding combination of chickens. These breeding combinations may include pure strains, strain crosses, breed crosses, incrosses, or combinations thereof. Kinds of stock and breeding methods are----

BPR	Barred Plymouth Rock	BX	Crossbred	IN	Incross
NH	New Hampshire	WL	White Leghorn	PS	Pure Strain
RIR	Rhode Island Red	WPR	White Plymouth Rock	SX	Strain Cross
Syn.	Synthetic				

Tests: Canada Central (C. C.)   New Hampshire Cage (N.H.-C.)
           Florida (Fla.)   New Hampshire Floor (N.H.-F.)
           Minnesota (Minn.)   North Carolina (N.C.)
           Missouri Cage (Mo.-C.)   Pennsylvania (Pa.)
           Missouri Floor (Mo.-F.)   Tennessee (Tenn.)

Test Year: A period beginning during the first year stated in a double-year designation and ending approximately 500 days later. See management summary shown in table 7.

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Definition of Traits

Trait	Definition
Growing mortality	Percentage of birds that died on or before the time they were 150 days old or subsequent age at housing.
Laying mortality	Percentage of birds that died after they were 150 days old or subsequent age at housing.
Age at 50 percent production	Days of age computed from the first day of the first two consecutive days of 50 percent production for living birds in the entry at that time.
Hen-housed egg production	Number of eggs laid per pullet housed computed from time of housing to the end of the test.
Hen-day egg production (to end of test)	Percent hen-day production from the time birds reached 50 percent production to end of test.
Hen-day egg production (last 30 to 60 days)	Percent hen-day production during the last 30 to 60 days of the test. Length of time involved varies according to the record keeping system of each individual test.
Feed per pound of eggs	Pounds of feed per pound of eggs produced, computed from bulk weighing of the eggs at least one day every two weeks or two days a month at equal intervals during the laying period of the test.
Egg weight	The weight of a dozen eggs computed from bulk weighing of the eggs at least one day every two weeks or two days a month during the laying period of the test.
Large and extra large eggs	Percentage of large and extra large eggs as determined by egg-size distribution computed from all eggs laid one day each week.
Albumen quality	Haugh units, computed from egg weight and albumen height of broken-out egg measured on one day's eggs per quarter, at equal intervals. The greater the Haugh units the higher the albumen quality.
Large blood spots	Percentage of eggs with one or more large blood spots (1/8 inch or more in diameter), computed from at least three days' eggs per quarter, broken-out basis.
Small blood spots	Percentage of eggs with one or more small blood spots (less than 1/8 inch in diameter), computed from at least three days' eggs per quarter, broken-out basis.
Large meat spots	Percentage of eggs with one or more colored large meat spots (1/8 inch or more in diameter), computed from at least three days' eggs per quarter, broken-out basis.
Small meat spots	Percentage of eggs with one or more colored small meat spots (less than 1/8 inch in diameter), computed from at least three days' egg per quarter, broken-out basis.
Specific gravity score	Eggs are given the specific gravity score that corresponds with the specific gravity of the solution in which they will float. Eggs that do not float in 1.100 solution are given a nine score. The specific gravity of an egg is closely correlated with shell thickness; therefore, the higher the specific gravity score, the thicker the shell. Tabulation of specific gravity solutions and the corresponding specific gravity scores follow:

Solution	Score	Solution	Score
1.068	0	1.088	5
1.072	1	1.092	6
1.076	2	1.096	7
1.080	3	1.100	8
1.084	4		

Trait	Definition
Body weight	Average weight of birds alive at end of test.
Income over feed and chick cost	Income over feed and chick cost per pullet housed, with chick cost in 1,000 lots at hatch date adjusted for mortality (accidental deaths, sexing errors, and missing chicks not included).

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Tests and Supervisors

Canada Central Egg Production Test
        W. K. Barr, Poultry Production Section, Canada Department of Agriculture, Ottawa, Ontario, Canada
            Phone 613/994-9571

Florida Poultry Evaluation Center
        R. B. Christmas, Chipley, Fla. 32428
            Phone 904/638-0588

Minnesota Random Sample Egg Production Test
        Robert E. Moehrle, Department of Agriculture, Division of Poultry Industries, 530 State Office Building,
        St. Paul, Minn. 55101
            Phone 612/296-2861

Missouri Random Sample Egg Production Test (Cage)
        Charles W. McElyea, P. O. Box 530, Mountain Grove, Mo. 65711
            Phone 612/296-2861

Missouri Random Sample Egg Production Test (Floor)
        Charles W. McElyea, P. O. Box 530, Mountain Grove, Mo. 65711
            Phone 417/926-4151

New Hampshire Egg Production Test (Cage)
        W. C. Skoglund, Department of Poultry Science, University of New Hampshire, Durham, N. H. 03824
            Phone 603/862-2130

New Hampshire Egg Production Test (Floor)
        W. C. Skoglund, Department of Poultry Science, University of New Hampshire, Durham, N.H. 03824
            Phone 603/862-2130

North Carolina Random Sample Egg Laying Test, Salisbury
        G. A. Martin, Poultry Extension Department, North Carolina State University, Raleigh, N. C. 27607
            Phone 919/755-2621

Pennsylvania Random Sample Laying Test
        Edgar V. Hammers, Pennsylvania Furnace, Pa. 16865
            Phone 814/692-8446

Tennessee Random Sample Laying Test
        H. V. Shirley, Jr., Animal Science Department, University of Tennessee, Knoxville, Tenn. 37916
            Phone 615/974-7374

Copies of the final report for any of the Random Sample Egg Production Tests listed above can be
obtained by writing to the test supervisor.

Table 1.--Two-year combined summary: Regressed means and 80% confidence limits for traits by stocks entered

STOCK CODE	STOCK — BREEDER'S NAME AND ADDRESS	STOCK — STRAIN OR TRADENAME	BREEDING		NO. PENS / NO. LOCATIONS	AVG. CHICK PRICE (cents)	MORTALITY — GROWING (percent) RE-GRESSED MEAN	80% CONF. LIMITS	MORTALITY — LAYING (percent) RE-GRESSED MEAN	80% CONF. LIMITS	AGE AT 50% PRODUCTION (days) RE-GRESSED MEAN	80% CONF. LIMITS	EGG PRODUCTION — HEN HOUSED (number) RE-GRESSED MEAN	80% CONF. LIMITS	EGG PRODUCTION — HEN-DAY (TO END OF TEST) (percent) RE-GRESSED MEAN	80% CONF. LIMITS	EGG PRODUCTION — HEN-DAY (LAST 30-60 DAYS) (percent) RE-GRESSED MEAN	80% CONF. LIMITS
570	Animal Research Institute Ottawa, Ontario, Canada	Kentville, R.B.C.	WL	PS	15 / 2	30.0	3.2	2.7 3.8	9.4	7.5 11.4	176	172 180	203	195 211	64.5	62.5 66.5	53.3	51.1 55.5
10	Anthony, George M. & Sons Strausstown, Pa. 19559	Anthony	WL	SX	57 / 15	31.9	3.3	2.7 3.8	13.1	11.3 15.0	177	173 181	214	208 220	68.5	67.2 69.8	58.3	56.8 59.8
307	Babcock Poultry Farm, Inc. Ithaca, N.Y. 14850	Babcock B-300	WL	IN	114 / 21	32.8	2.5	2.0 2.9	7.6	6.4 8.9	167	164 170	242	237 247	74.3	73.1 75.5	64.8	63.5 66.1
443	Babcock Poultry Farm, Inc. Ithaca, N.Y. 14850	Babcock B-303	WL	IN	9 / 3	35.0	2.7	2.4 3.1	5.1	3.8 6.8	176	172 180	231	223 239	68.6	66.7 70.5	62.9	60.5 65.3
442	Babcock Poultry Farm, Inc. Ithaca, N.Y. 14850	Babcock B-380	RIRxSYN	BX	24 / 7	32.1	2.2	1.8 2.6	6.1	4.7 7.8	180	176 184	233	225 241	73.6	71.9 75.3	59.0	56.9 61.1
982	Canada Dept. of Agriculture Ottawa, Ontario, Canada	P. D. 58	WL	Syn.	16 / 2	35.0	2.7	2.3 3.2	8.2	6.5 10.1	170	167 173	233	225 241	72.2	70.3 74.1	64.5	62.2 66.8
446	Carey Farms Marion, Ohio 43302	Carey Nick 300	WL	SX	4 / 2	32.0	2.6	2.3 2.9	5.5	4.1 7.1	176	172 180	234	225 243	72.4	70.1 74.7	65.5	63.0 68.0
437	Carey Farms Marion, Ohio 43302	Carey Nick 310	WL	IN	10 / 5	32.3	2.1	1.7 2.5	4.0	2.8 5.4	184	181 187	229	221 237	73.0	71.2 74.8	69.7	67.5 71.9
289	Colonial Poultry Farm, Inc. Pleasant Hill, Mo. 64080	True-Line 365 B	WL	IN	42 / 13	25.0	2.4	2.0 2.9	4.9	3.8 6.1	172	169 175	225	219 231	68.4	67.0 69.8	61.1	59.4 62.8
392	Colonial Poultry Farm, Inc. Pleasant Hill, Mo. 64080	True-Line 365 H	WL	IN	9 / 1	25.0	2.6	2.3 3.0	12.5	10.4 14.9	173	169 177	226	217 235	66.2	63.9 68.5	55.8	53.3 58.3
431	Colonial Poultry Farm, Inc. Pleasant Hill, Mo. 64080	True-Line 365 K	WL	IN	13 / 2	25.0	2.5	2.1 2.9	9.9	7.9 12.0	171	167 175	228	219 237	67.2	65.1 69.3	56.1	53.6 58.6
432	Colonial Poultry Farm, Inc. Pleasant Hill, Mo. 64080	True-Line 365 S	WL	IN	37 / 11	25.0	2.6	2.1 3.0	8.4	6.9 10.2	168	165 171	230	224 236	69.9	68.4 71.4	56.7	54.8 58.6
439	Colonial Poultry Farm, Inc. Pleasant Hill, Mo. 64080	Colonial RIR	RIR	PS	2 / 1	34.0	2.5	2.3 2.8	9.6	7.9 11.4	179	175 183	203	193 213	65.3	62.9 67.7	****	****

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STOCK CODE	FEED PER POUND OF EGGS PRODUCED (pounds)		EGG WEIGHT (oz./doz.)		LARGE AND EXTRA LARGE EGGS (percent)		ALBUMEN QUALITY (Haugh units)		BLOOD SPOTS 1/8 INCH OR MORE (percent)		BLOOD SPOTS LESS THAN 1/8 INCH (percent)		MEAT SPOTS 1/8 INCH OR MORE (percent)		MEAT SPOTS LESS THAN 1/8 INCH (percent)		SPECIFIC GRAVITY SCORE		BODY WEIGHT (pounds)		INCOME OVER FEED & CHICK COST (dollars)	
	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS	RE-GRESSED MEAN	80% CONF. LIMITS
570	3.04	2.94 / 3.14	24.0	23.6 / 24.4	55.3	52.3 / 58.3	74.9	73.8 / 76.0	1.6	1.2 / 1.7	2.3	1.8 / 2.9	0.4	0.1 / 1.0	0.8	0.4 / 1.4	2.99	2.84 / 3.14	4.28	4.11 / 4.45	2.50	2.18 / 2.82
10	2.81	2.74 / 2.88	25.2	24.9 / 25.5	75.6	73.0 / 78.2	79.4	78.8 / 80.0	1.3	1.0 / 1.6	1.8	1.4 / 2.2	0.1	0.1 / 0.2	0.2	0.1 / 0.4	3.14	3.02 / 3.26	4.00	3.88 / 4.12	3.03	2.83 / 3.23
307	2.56	2.50 / 2.62	25.5	25.2 / 25.8	79.3	76.9 / 81.7	77.8	77.3 / 78.3	1.0	0.8 / 1.2	0.9	0.7 / 1.2	0.1	0.1 / 0.2	0.3	0.2 / 0.5	3.99	3.88 / 4.10	4.13	4.01 / 4.25	3.65	3.32 / 3.98
443	2.61	2.52 / 2.70	24.6	24.2 / 25.0	77.3	74.3 / 80.3	83.5	82.3 / 84.7	0.7	0.5 / 0.9	1.3	1.0 / 1.8	0.1	0.1 / 0.5	0.4	0.1 / 0.9	5.36	5.20 / 5.52	3.57	3.40 / 3.74	****	**** / ****
442	2.90	2.82 / 2.98	26.6	26.2 / 27.0	84.9	81.9 / 87.9	79.5	78.6 / 80.4	0.6	0.4 / 0.9	2.1	1.6 / 2.6	3.6	2.4 / 5.1	13.1	11.7 / 14.7	3.70	3.55 / 3.85	4.95	4.79 / 5.11	3.24	2.89 / 3.59
982	2.65	2.56 / 2.74	24.2	23.8 / 24.6	58.2	55.2 / 61.2	81.7	80.6 / 82.8	0.7	0.5 / 1.0	1.5	1.1 / 1.9	0.3	0.1 / 0.7	1.6	0.9 / 2.3	3.44	3.29 / 3.59	4.13	3.96 / 4.30	3.71	3.70 / 3.72
446	2.19	2.08 / 2.30	25.3	24.9 / 25.7	80.8	77.3 / 84.3	83.8	82.3 / 85.3	0.7	0.5 / 0.9	1.2	0.8 / 1.6	0.3	0.1 / 0.9	0.2	0.1 / 0.6	3.24	3.05 / 3.43	4.47	4.27 / 4.67	3.54	3.30 / 3.78
437	2.81	2.72 / 2.90	25.6	25.2 / 26.0	79.5	76.6 / 82.4	86.5	85.3 / 87.7	1.1	0.8 / 1.4	0.7	0.4 / 1.1	0.1	0.1 / 0.4	0.4	0.2 / 0.9	4.90	4.75 / 5.05	4.61	4.46 / 4.76	3.50	3.27 / 3.73
289	2.54	2.47 / 2.61	25.2	24.9 / 25.5	80.6	78.1 / 83.1	80.5	79.9 / 81.1	0.5	0.4 / 0.7	0.9	0.6 / 1.2	0.1	0.1 / 0.2	0.1	0.1 / 0.2	4.97	4.85 / 5.09	3.62	3.50 / 3.74	3.60	3.38 / 3.82
392	2.75	2.64 / 2.86	24.8	24.3 / 25.3	77.9	74.4 / 81.4	69.3	67.9 / 70.7	1.6	1.3 / 2.0	2.9	2.3 / 3.5	0.2	0.1 / 0.7	0.8	0.3 / 1.6	3.39	3.21 / 3.57	3.62	3.41 / 3.83	3.10	2.75 / 3.45
431	2.75	2.65 / 2.85	24.6	24.1 / 25.1	76.4	73.2 / 79.6	69.7	68.4 / 71.0	1.7	1.3 / 2.1	3.7	3.1 / 4.4	0.3	0.1 / 0.8	1.3	0.6 / 2.2	3.67	3.50 / 3.84	3.46	3.27 / 3.65	3.32	2.98 / 3.66
432	2.56	2.48 / 2.64	24.7	24.3 / 25.1	71.4	68.6 / 74.2	75.9	75.1 / 76.7	1.1	0.8 / 1.4	1.6	1.2 / 2.1	0.2	0.1 / 0.5	0.9	0.6 / 1.3	3.27	3.14 / 3.40	3.66	3.52 / 3.80	3.47	3.14 / 3.80
439	3.60	3.48 / 3.72	25.1	24.7 / 25.5	77.1	73.3 / 80.9	****	**** / ****	****	**** / ****	****	**** / ****	****	**** / ****	****	**** / ****	****	**** / ****	4.75	4.51 / 4.99	1.67	1.39 / 1.95

*If the confidence limits for two regressed means overlap, the two means are not significantly different at the 5% level.

Table 1.--Two-year combined summary: Regressed means and 80% confidence limits for traits by stocks entered (*Continued*)

STOCK CODE	BREEDER'S NAME AND ADDRESS	STOCK BREEDING	STOCK STRAIN OR TRADENAME	NO. PENS / NO. LOCATIONS	AVG. CHICK PRICE (cents)	MORTALITY GROWING (percent) RE-GRESSED MEAN	MORTALITY GROWING 80% CONF. LIMITS	MORTALITY LAYING (percent) RE-GRESSED MEAN	MORTALITY LAYING 80% CONF. LIMITS	AGE AT 50% PRODUCTION (days) RE-GRESSED MEAN	AGE AT 50% PRODUCTION 80% CONF. LIMITS	HEN HOUSED (number) RE-GRESSED MEAN	HEN HOUSED 80% CONF. LIMITS	EGG PRODUCTION HEN-DAY (TO END OF TEST) (percent) RE-GRESSED MEAN	HEN-DAY (TO END OF TEST) 80% CONF. LIMITS	HEN-DAY (LAST 30-60 DAYS) (percent) RE-GRESSED MEAN	HEN-DAY (LAST 30-60 DAYS) 80% CONF. LIMITS
309	Davis, Joe K., Hatchery Earl, N.C. 28038	RIRxBPR BX	Davis Combiner	38 / 6	33.5	2.9	2.4 3.4	8.9	7.2 10.7	184	180 188	196	180 203	63.6	61.9 65.3	53.4	51.4 55.4
447	Euribrid, B. V. Boxmeer, Holland	WL SX	Hisex White	14 / 4	35.3	2.1	1.7 2.4	8.0	6.3 10.0	179	175 183	242	233 251	75.2	73.2 77.2	62.0	59.6 64.4
607	Fisher Poultry Farm, Ltd. Ayton, Ontario, Canada	WL SX	Fisher 107	56 / 11	32.1	2.4	1.9 2.9	10.8	9.1 12.6	176	173 179	218	212 224	68.1	66.7 69.5	57.6	55.8 59.4
66	Garber Poultry Br. Farm Modesto, Calif. 95351	WL SX	Garber G200	41 / 10	28.4	3.1	2.6 3.6	8.1	6.6 9.7	174	171 177	221	215 227	68.1	66.7 69.5	61.7	60.1 63.3
225	Harco Farms South Easton, Mass. 02375	RIRxBPR	Harco Sex Link	22 / 2	32.0	2.5	2.1 2.9	5.4	3.9 7.0	178	174 182	225	217 233	68.6	66.5 70.7	57.7	55.2 60.2
86	Hardy, C. Nelson & Son Essex, Mass. 01929	RIRxBPR BX	Deluxe Sex Link	6 / 1	30.0	2.0	1.7 2.3	5.4	4.0 7.1	177	173 181	207	197 217	62.2	60.0 64.4	53.7	51.2 56.2
378	Hubbard Farms, Inc. Walpole, N.H. 03608	Syn.xN.H.	Golden Comet	32 / 6	30.0	2.1	1.7 2.5	5.0	3.8 6.4	171	168 174	223	216 230	69.2	67.6 70.8	53.8	51.9 55.7
356	Ideal Poultry Br. Farms Cameron, Texas 76520	Syn.xWL BX	Ideal 236	71 / 17	27.0	3.2	2.6 3.7	7.9	6.6 9.3	171	168 174	230	224 236	70.6	69.4 71.8	63.3	61.9 64.7
234	Indiana Farm Bureau Coop. Indianapolis, Ind. 46204	WL SX	Duchess 60	57 / 11	32.0	3.5	2.9 4.1	12.3	10.4 14.2	172	169 175	224	218 230	70.7	69.3 72.1	60.0	58.3 61.7
589	Kath Line of Canada Aldergrove, Br. Col., Can.	WL SX	Kath Line H 63	16 / 2	39.0	2.5	2.0 2.9	11.9	9.8 14.2	172	169 175	212	204 220	68.3	66.4 70.2	59.6	57.3 61.0
117	Lawton Farms Foxboro, Mass. 02035	RIRxWPR BX	Buff Sex Link	6 / 1	32.0	2.7	2.4 3.1	3.7	2.5 5.0	177	173 181	213	204 222	64.0	61.7 66.3	52.6	50.1 55.1
450	Missouri Valley Hatchery Marshall, Mo. 65340	WL SX	Valley Queen	2 / 1	30.0	2.4	2.2 2.7	7.9	6.4 9.6	181	177 185	213	203 223	69.5	67.0 72.0	63.1	60.8 65.4
409	N. Cen. Reg. Plty. Br. Lab. Lafayette, Ind. 47907	WL SX	Kentville-Cornell	24 / 7	30.0	2.3	1.9 2.8	9.8	8.0 11.7	175	171 179	203	197 209	65.9	64.3 67.5	54.6	52.8 56.4

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STOCK CODE	FEED PER POUND OF EGGS PRODUCED (pounds)		EGG WEIGHT (oz./doz.)		LARGE AND EXTRA LARGE EGGS (percent)		ALBUMEN QUALITY (Haugh units)		BLOOD SPOTS 1/8 INCH OR MORE (percent)		BLOOD SPOTS LESS THAN 1/8 INCH (percent)		MEAT SPOTS 1/8 INCH OR MORE (percent)		MEAT SPOTS LESS THAN 1/8 INCH (percent)		SPECIFIC GRAVITY SCORE		BODY WEIGHT (pounds)		INCOME OVER FEED & CHICK COST (dollars)	
	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS
309	3.31	3.23 3.39	26.7	26.3 27.1	87.3	84.6 90.0	76.5	75.6 77.4	1.4	1.1 1.7	2.3	1.8 2.9	5.7	4.3 7.3	9.5	8.3 10.9	3.02	2.89 3.15	5.73	5.59 5.87	2.23	1.99 2.47
447	2.73	2.63 2.83	25.4	24.9 25.9	74.9	71.6 78.2	79.6	78.3 80.9	1.0	0.8 1.3	1.6	1.2 2.1	0.1	0.1 0.4	0.7	0.3 1.3	5.03	4.85 5.21	4.30	4.12 4.48	3.46	3.12 3.80
607	2.81	2.74 2.88	25.0	24.7 25.3	73.8	71.3 76.3	75.6	74.9 76.3	1.2	1.0 1.5	1.7	1.3 2.2	0.2	0.1 0.5	1.1	0.8 1.4	3.37	3.25 3.49	4.26	4.14 4.38	3.07	2.72 3.42
66	2.73	2.66 2.80	24.3	23.9 24.7	71.6	69.0 74.2	81.9	81.2 82.6	0.6	0.4 0.8	1.2	0.9 1.6	0.1	0.1 0.3	0.2	0.1 0.4	4.89	4.78 5.00	4.03	3.90 4.16	3.31	2.96 3.66
225	3.13	3.03 3.23	26.5	26.1 26.9	91.1	87.9 94.3	81.8	80.4 83.2	0.7	0.6 1.0	1.4	1.0 1.8	1.6	0.7 2.8	19.9	17.1 22.9	3.21	3.04 3.38	5.78	5.60 5.96	3.31	3.13 3.49
86	3.30	3.19 3.41	25.8	25.4 26.2	87.2	83.8 90.6	76.6	74.9 78.3	0.8	0.6 0.9	1.7	1.4 2.1	1.1	0.4 2.2	22.3	18.5 26.3	3.75	3.54 3.96	5.72	5.50 5.94	2.50	2.18 2.82
378	2.73	2.65 2.81	26.9	26.5 27.3	82.2	79.5 84.9	78.1	77.3 78.9	1.3	1.0 1.6	2.2	1.7 2.8	6.2	4.9 7.8	11.3	10.1 12.6	3.80	3.67 3.93	4.88	4.74 5.02	3.13	2.86 3.40
356	2.57	2.51 2.63	25.6	25.2 26.0	80.4	77.9 82.9	76.1	75.5 76.7	0.6	0.4 0.6	1.0	0.8 1.3	0.1	0.1 0.2	0.3	0.2 0.4	4.14	4.03 4.25	4.41	4.29 4.53	3.68	3.42 3.94
234	2.75	2.66 2.80	25.0	24.6 25.4	72.7	70.1 75.3	81.7	81.0 82.4	0.8	0.6 1.1	1.7	1.3 2.1	0.1	0.1 0.2	0.4	0.3 0.7	4.05	3.94 4.18	4.20	4.07 4.33	3.45	3.25 3.65
589	2.87	2.78 2.96	24.9	24.5 25.3	68.1	65.1 71.1	76.5	75.4 77.6	1.1	0.8 1.4	1.9	1.4 2.4	0.3	0.1 0.7	1.4	0.9 2.2	2.96	2.81 3.11	4.41	4.24 4.58	2.93	2.59 3.27
117	3.27	3.16 3.38	25.7	25.3 26.1	86.6	83.2 90.0	78.0	76.3 79.7	0.8	0.6 1.0	1.7	1.4 2.1	1.7	0.8 2.9	27.2	23.1 31.5	3.84	3.64 4.04	5.55	5.34 5.76	2.69	2.35 3.03
450	3.17	3.05 3.29	25.0	24.6 25.4	76.8	73.1 80.5	*****	**** ****	*****	**** ****	*****	**** ****	*****	***** *****	*****	***** *****	*****	**** ****	4.11	3.87 4.35	3.06	2.74 3.38
409	3.12	3.04 3.20	24.2	23.8 24.6	65.8	63.1 68.5	75.8	75.0 76.6	1.3	1.0 1.6	1.7	1.3 2.2	0.1	0.1 0.4	0.9	0.6 1.3	3.56	3.44 3.68	4.59	4.45 4.73	2.63	2.33 2.93

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*If the confidence limits for two regressed means overlap, the two means are not significantly different at the 5% level.

Table 1.--Two-year combined summary: Regressed means and 80% confidence limits for traits by stocks entered (Continued)

STOCK CODE	BREEDER'S NAME AND ADDRESS	STOCK BREEDING	STRAIN OR TRADENAME	NO. PENS / NO. LOCATIONS	AVG. CHICK PRICE (cents)	MORTALITY GROWING (percent) REGRESSED MEAN	80% CONF. LIMITS	MORTALITY LAYING (percent) REGRESSED MEAN	80% CONF. LIMITS	AGE AT 50% PRODUCTION (days) REGRESSED MEAN	80% CONF. LIMITS	HEN HOUSED (number) REGRESSED MEAN	80% CONF. LIMITS	EGG PRODUCTION HEN-DAY (TO END OF TEST) (percent) REGRESSED MEAN	80% CONF. LIMITS	HEN-DAY (LAST 30-60 DAYS) (percent) REGRESSED MEAN	80% CONF. LIMITS
37	N. Cent. Reg. Plty. Br. Lab. Lafayette, Ind. 47907	WL PS	Reg. Cornell Contr	13 / 2	30.0	2.9	2.5 3.3	12.4	10.2 14.7	179	175 183	215	207 223	64.9	62.9 66.9	54.7	52.3 57.1
352	Parks Poultry Farm Altoona, Pa. 16601	WL SX	Keystone B-1	63 / 17	33.8	3.1	2.6 3.7	6.3	5.1 7.6	174	171 177	233	227 239	72.0	70.7 73.3	60.2	58.6 61.8
382	Parks Poultry Farm Altoona, Pa. 16601	RIRxWPR BX	Sil-Go-Links	10 / 3	34.0	2.2	1.8 2.6	7.5	5.8 9.3	179	175 183	195	187 203	62.7	60.8 64.6	53.2	50.8 55.6
181	Shaver Poultry Br. Farm Galt, Ontario, Canada	WL SX	Starcross 288	105 / 18	31.2	2.5	2.0 3.0	5.6	4.5 6.8	173	170 176	245	239 251	75.2	73.9 76.5	64.8	63.4 66.2
451	Shaver Poultry Br. Farm Galt, Ontario, Canada	RIR SX	Starcross 579	10 / 3	35.0	3.1	2.6 3.6	8.1	6.3 10.0	173	169 177	211	203 219	66.5	64.5 68.5	54.0	51.6 56.4
566	St. Augustin Coop. Hatchery St. Augustin, Quebec, Can.	WL SX	Corvette A 1	16 / 2	31.0	2.7	2.3 3.2	11.3	9.3 13.5	176	172 180	216	208 224	69.3	67.4 71.2	63.7	61.4 66.0
401	Tatum Farms Dawsonville, Ga. 30534	WL SX	Tatum T-100	64 / 16	30.1	2.2	1.8 2.7	9.5	8.1 11.1	172	169 175	225	219 231	70.3	69.0 71.6	63.6	62.2 65.0
449	Tatum Farms Dawsonville, Ga. 30534	RIRxSyn. BX	Tatum T-173	25 / 9	30.0	1.0	0.7 1.3	5.6	4.2 7.2	171	168 174	226	218 234	69.0	67.3 70.7	54.3	52.1 56.5
407	Thornbers Plty. Br. Dept. Halifax, Yorkshire, Eng.	WL SX	Thornber 808	54 / 16	30.0	2.7	2.2 3.2	9.3	7.7 11.0	177	174 180	220	214 226	70.3	68.9 71.7	62.3	60.7 63.9
449	Welp's Poultry Breeding Fm. Bancroft, Iowa 50517	RIR SX	Welp Line 650 N	16 / 2	30.0	2.2	1.9 2.5	4.6	3.3 6.1	175	170 180	229	220 238	69.7	67.5 71.9	56.5	5?.?
430	Welp's Poultry Breeding Fm. Bancroft, Iowa 50517	WL IN	Welp Line 971	47 / 13	29.0	3.9	3.4 4.6	9.9	8.3 11.7	168	164 172	214	208 220	66.4	64.9 67.9	53.7	52.1 55.3
448	Welp's Poultry Breeding Fm. Bancroft, Iowa 50517	WL IN	Welp Line 973	22 / 9	29.0	2.7	2.3 3.2	13.0	10.9 15.3	173	169 177	190	182 198	60.3	58.6 62.0	50.4	48.4 52.4

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STOCK CODE	FEED PER POUND OF EGGS PRODUCED (pounds) REGRESSED MEAN	80% CONF. LIMITS	EGG WEIGHT (oz./doz.) REGRESSED MEAN	80% CONF. LIMITS	LARGE AND EXTRA LARGE EGGS (percent) REGRESSED MEAN	80% CONF. LIMITS	ALBUMEN QUALITY (Haugh units) REGRESSED MEAN	80% CONF. LIMITS	BLOOD SPOTS 1/8 INCH OR MORE (percent) REGRESSED MEAN	80% CONF. LIMITS	BLOOD SPOTS LESS THAN 1/8 INCH (percent) REGRESSED MEAN	80% CONF. LIMITS	MEAT SPOTS 1/8 INCH OR MORE (percent) REGRESSED MEAN	80% CONF. LIMITS	MEAT SPOTS LESS THAN 1/8 INCH (percent) REGRESSED MEAN	80% CONF. LIMITS	SPECIFIC GRAVITY SCORE REGRESSED MEAN	80% CONF. LIMITS	BODY WEIGHT (pounds) REGRESSED MEAN	80% CONF. LIMITS	INCOME OVER FEED & CHICK COST (dollars) REGRESSED MEAN	80% CONF. LIMITS
37	3.19	3.09 / 3.29	24.1	23.7 / 24.5	71.3	68.0 / 74.6	69.3	68.0 / 70.6	1.5	1.1 / 1.6	3.2	2.6 / 3.8	0.3	0.1 / 0.9	0.9	0.4 / 1.6	3.27	3.10 / 3.44	4.15	3.97 / 4.33	2.41	2.18 / 2.64
352	2.62	2.56 / 2.68	25.2	24.9 / 25.5	75.7	73.3 / 78.1	81.5	80.9 / 82.1	0.5	0.3 / 0.6	0.9	0.6 / 1.2	0.1	0.1 / 0.3	0.2	0.1 / 0.3	4.25 / 4.47		4.14	4.02 / 4.26	3.37	3.16 / 3.58
382	3.19	3.10 / 3.28	27.3	26.9 / 27.7	78.7	75.8 / 81.6	82.1	80.9 / 83.3	0.8	0.6 / 1.1	1.5	1.1 / 1.9	0.9	0.3 / 1.9	15.1	13.0 / 17.5	5.34	5.18 / 5.50	5.30	5.14 / 5.46	1.94	1.74 / 2.14
181	2.58	2.52 / 2.64	25.7	25.3 / 26.1	80.2	77.8 / 82.6	79.9	79.3 / 80.5	0.5	0.3 / 0.6	1.3	1.1 / 1.6	0.1	0.1 / 0.2	0.3	0.2 / 0.5	4.04	3.93 / 4.15	4.26	4.15 / 4.37	3.73	3.41 / 4.05
451	3.08	2.98 / 3.18	26.3	25.8 / 26.8	81.4	78.1 / 84.7	77.7	76.5 / 78.9	1.2	0.9 / 1.6	4.1	3.4 / 4.9	1.5	0.7 / 2.7	9.4	7.6 / 11.4	1.87	1.70 / 2.04	5.25	5.07 / 5.43	2.70	2.37 / 3.06
566	2.75	2.65 / 2.85	24.5	24.1 / 24.9	62.8	59.8 / 65.8	81.1	80.0 / 82.2	0.8	0.5 / 1.0	1.6	1.2 / 2.1	0.4	0.1 / 1.0	1.3	0.8 / 2.1	3.36	3.22 / 3.50	4.24	4.07 / 4.41	3.22	2.87 / 3.57
401	2.65	2.58 / 2.72	25.2	24.8 / 25.6	77.8	75.3 / 80.3	82.5	82.0 / 83.2	0.5	0.7 / 1.	1.5	1.1 / 1.8	0.1	0.1 / 0.2	0.2	0.1 / 0.3	4.01	3.90 / 4.12	4.18	4.07 / 4.29	3.32	2.98 / 3.66
449	2.94	2.86 / 3.02	26.5	26.1 / 26.9	85.6	82.5 / 88.7	79.5	78.6 / 80.4	1.2	0.9 / 1.6	2.8	2.2 / 3.4	2.2	1.3 / 3.4	21.9	20.1 / 23.7	3.67	3.52 / 3.82	5.02	4.86 / 5.18	3.19	2.84 / 3.54
407	2.80	2.73 / 2.87	25.0	24.7 / 25.3	72.1	69.3 / 74.9	76.7	76.0 / 77.4	0.6	0.4 / 0.8	1.0	0.7 / 1.3	0.1	0.1 / 0.3	0.3	0.1 / 0.4	3.59	3.47 / 3.71	4.30	4.17 / 4.43	3.26	3.00 / 3.52
440	3.21	3.10 / 3.32	25.5	25.0 / 26.0	72.1	68.6 / 75.6	80.0	78.3 / 81.7	0.8	0.7 / 1.0	2.3	1.9 / 2.7	1.3	0.6 / 2.4	13.9	10.7 / 17.6	3.30	3.09 / 3.51	4.68	4.49 / 4.87	3.21	2.89 / 3.53
430	2.77	2.70 / 2.84	24.7	24.3 / 25.1	73.9	71.2 / 76.6	76.6	76.0 / 77.2	0.6	0.4 / 0.8	2.1	1.6 / 2.5	0.2	0.1 / 0.4	0.3	0.1 / 0.4	3.51	3.39 / 3.63	3.97	3.84 / 4.10	3.10	2.75 / 3.45
448	2.91	2.83 / 2.99	24.9	24.5 / 25.3	76.2	73.0 / 79.4	78.8	77.9 / 79.7	0.8	0.5 / 1.0	1.4	1.1 / 1.9	0.1	0.1 / 0.3	0.2	0.1 / 0.4	4.38	4.23 / 4.53	4.03	3.87 / 4.19	2.41	2.07 / 2.75

*If the confidence limits for two regressed means overlap, the two means are not significantly different at the 5% level.

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PROCEDURES USED FOR COMPUTING COMBINED SUMMARY VALUES

Statistical Methods

The two-year combined summary includes performance data on 31 stocks that were entered in both the 1972-73 and 1973-74 tests and on 7 stocks that were entered only in the 1973-74 tests. Birds were tested at 19 locations in 1972-73 and at 21 locations in 1973-74. Table 3 lists the locations. Certain traits were not measured at some of the locations. These are identified with an NR (not reported) in the appropriate columns in table 3.

Replicate data were reported by 18 locations in 1972-73 and by 19 locations in 1973-74. The number of pens and the number of stocks tested at each location for the two years are given in table 3.

The percentage data for both years for the six traits--growing mortality, laying mortality, large blood spots, small blood spots, large meat spots, and small meat spots--were converted to angles with the arcsin transformation prior to analysis. However, the test-year adjustment factors shown in table 3 and the regressed means and confidence limits shown for these traits in table 1 are given in percent.

The replicate data were analyzed by least-squares procedures to obtain the test-year adjustment factors shown in table 3 and the repeatability estimates and the correlations among pens within tests shown in table 2. The test-year adjustment factors were then used to adjust the simple stock average for test and year effects. The adjusted stock averages (the least-squares stock means) were then regressed toward the overall mean ($\hat{\mu}$) to account for variations in number of tests entered, number of years entered, and number of replicated per test. The formula used to compute the regressed mean is:

$$\text{Regressed Mean} = \hat{\mu} + \frac{r_{2/C}}{1+(k_3-1)x_1+(k_1-k_3)x_2+(k_2-k_3)r_1+[(1/C)-k_1-k_2+k_3]r_2} \text{(s)}$$

where:

$\hat{\mu}$ = the average of the test and year adjusted stock means.

r_1 = repeatability within year.

r_2 = repeatability from year-to-year.

x_1 = the correlation among replicates within year and test.

x_2 = the correlation among pens of the same stock from year-to-year for the same test.

k_1 = an average of the number of pens per test (averaged over years).

k_2 = an average of the number of pens per year (averaged over tests).

k_3 = an average of the number of replicated per test-year subclass.

C = the diagonal inverse element for that stock. The reciprocal of C, i.e., $\frac{1}{C}$, is equal to nk_3 if the assumption is made that the adjustments for test-year effects are made without error; where n is the number of test-year subclasses in which that stock is entered.

s = the test-year adjusted stock average minus the overall mean $\hat{\mu}$.

The correlations used in computing the regression coefficient were obtained from estimates of the variance components for stocks ($\hat{\sigma}_s^2$), the stock-X-test interaction ($\hat{\sigma}_{st}^2$), the stock-X-year interaction ($\hat{\sigma}_{sy}^2$), and the random error ($\hat{\sigma}_e^2$). The variance component estimates were obtained by equating the computed mean squares for these effects to their expectations. The mean squares for stocks was adjusted for the test-year subclass effects and the mean squares for the stock-X-test interaction and the stock-X-year interaction were adjusted by least-squares procedures for the effects of stocks and the test-year subclasses. The three-factor interaction was assumed to be non-existent. Ratios of the variance component estimates that were used to compute the correlations follow:

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$$\text{Correlation Among Replicates} = x_1 = \frac{\hat\sigma_s^2 + \hat\sigma_{st}^2 + \hat\sigma_{sy}^2}{\hat\sigma_s^2 + \hat\sigma_{st}^2 + \hat\sigma_{sy}^2 + \hat\sigma_e^2}$$

$$\text{Correlations from Year-to-Year (same test)} = x_2 = \frac{\hat\sigma_s^2 + \hat\sigma_{st}^2}{\hat\sigma_s^2 + \hat\sigma_{st}^2 + \hat\sigma_{sy}^2 + \hat\sigma_e^2}$$

$$\text{Repeatability from Test-to-Test (within year)} = r_1 = \frac{\hat\sigma_s^2 + \hat\sigma_{sy}^2}{\hat\sigma_s^2 + \hat\sigma_{st}^2 + \hat\sigma_{sy}^2 + \hat\sigma_e^2}$$

$$\text{Repeatability from Test-to-Test (between years)} = r_2 = \frac{\hat\sigma_s^2}{\hat\sigma_s^2 + \hat\sigma_{st}^2 + \hat\sigma_{sy}^2 + \hat\sigma_e^2}$$

An approximate standard error (SE) was computed for each regressed mean as follows:

$$SE = b \sqrt{C(\hat\sigma_e^2 + k_1 \hat\sigma_{st}^2 + k_2 \hat\sigma_{sy}^2)}$$

where b is the regression coefficient given above in the formula for the regressed mean. Confidence limits were then computed for each regressed mean as follows:

$$\text{Regressed Mean} \pm 1.3\ SE$$

The constant 1.3 was selected in order that the probability of the confidence limits overlapping by chance alone between any two means would be about 0.03. This makes the test of significance among regressed means almost comparable to using Duncan's range test at the 0.05 level of probability.

Definition of Statistical Terms

The following definitions will help the reader interpret the analytical procedures:

Overall mean — The average of the test-year adjusted means for all stocks. This is an estimate of what the overall average would have been had all stocks been entered in all tests in both years.

Range — The range represents the difference between the expected maximum and minimum performance among the 68* stocks, based on the regressed means.

Common stocks — Stocks that are being tested at more than one location.

Test-year adjustment factor. — The amount added to or subtracted from the actual performance of the stocks at a given location in a given year to bring them to the average of all the location-year subclasses that had complete data. These factors were determined on an intrastock basis with a least-squares analysis, and they are given in table 3.

Repeatability within year — An intraclass correlation that measures the tendency for common stocks to rank the same from test-to-test within year. Theoretically, it can vary from 0.00 to 1.00.

Repeatability between years — A correlation which measures the tendency for common stocks to rank the same from test-to-test from one year to another. The difference between the repeatability within year and repeatability between years indicates the relative importance of the stock-by-year interaction.

Correlation among replicates — This correlation measures the repeatability among replicates of the same stock in the same test and year. The higher the correlation among replicates the less need there is for replication of stocks within test and year.

Correlation from year-to-year within tests — A correlation which measures the tendency for common stock to rank the same from year-to-year when tested at the same location. The difference in the repeatability between years and in the correlation from year-to-year within tests indicates the relative importance of the stock-by-test interaction.

Confidence limits — The confidence limits for each regressed mean are computed so that the probability is about 0.80 that the "true" stock mean lies within the interval. They are presented in this report, however, for the purpose of providing approximate tests of significance for differences among stocks.

*Includes 30 experimental stocks.

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TABLE 2. --Analytical data for the traits measured 1972-73 and 1973-74

Traits	Overall means	Regressed means		Repeatability		Correlations within test	
		Min.	Max.	Within year (r_1)	Year-to-year (r_2)	Among replicates (x_1)	Year-to-year (x_2)
Growing mortality--------percent-	3.5	1.9	3.9	0.1696	0.0851	0.2276	0.1432
Laying mortality---------percent-	15.3	2.9	13.7	.2093	.1761	.2864	.2532
Age at 50% production ------- days-	12.4	164	191	.5631	.5032	.7232	.6632
Hen-housed egg production -number-	226.2	190	253	.5314	.4855	.6447	.5988
Hen-day egg production to end of test-----------------percent-	70.4	60.3	77.8	.5478	.5100	.6650	.6271
Hen-day egg production last 30 to 60 days---------------percent-	61.0	50.4	70.4	.3530	.3367	.4991	.4828
Feed per pound of eggs ---- pounds-	2.66	2.08	3.31	.6052	.5608	.7590	.7146
Egg weight --------- ounces/dozen-	25.3	24.0	27.3	.7590	.6439	.8453	.7301
Large and extra large eggs-percent-	76.5	55.3	91.1	.6913	.5741	.8050	.6878
Albumen quality------- Haugh units-	79.5	69.3	86.5	.6257	.6242	.6727	.6712
Large blood spots ---------percent-	.8	.3	1.7	.1271	.1151	.2385	.2265
Small blood spots --------percent-	1.4	.7	4.1	.1246	.1212	.2527	.2494
Large meat spots ---------percent-	.5	.1	5.7	.7144	.6644	.8144	.7644
Small meat spots----------percent-	1.3	.0	27.2	.8176	.8149	.8635	.8609
Specific gravity ----------- score-	4.0	1.87	5.72	.6373	.5908	.6783	.6318
Body weight ------------- pounds-	4.45	3.46	5.88	.8418	.8008	.9308	.8898
Income over feed and chick cost--------------------dollars-	3.28	1.67	4.96	.4650	.4350	.5800	.5500

NOTE: The values for these factors are based on the 38 commercially available stocks as well as the 30 experimental stocks that were tested. The individual performance data for the experimental entries were analyzed but not published in this report.

TABLE 3.--Factors used to adjust for test differences

Test	Pens (number)		Stocks tested (number)		Mortality (percent)			
					Growing period		Laying period	
	1973	1974	1973	1974	1973	1974	1973	1974
Central Canada No. 6 - (2/cage)---	48	48	12	12	-3.50	+01.83	+3.71	+2.29
Central Canada No. 7 - (2/cage)---	48	48	12	12	+3.95	+ 2.96	-3.20	.-3.01
Florida No 1 - Floor -----------	--	24	--	12	--	+ 2.69	--	+1.38
Florida No. 2 - (2/cage)----------	48	48	12	12	- .94	+ 1.21	- .74	+1.89
Florida No. 6 - Floor -----------	--	24	--	12	--	+ 3.74	--	+3.34
Florida No. 5 - (2/cage)----------	48	48	12	12	+ .13	+ .50	-1.31	- .01
Minnesota No. 1 - Floor----------	14	10	14	10	-1.00	+ 4.38	- .87	+ .98
Minnesota No. 4 - (3/cage) -------	39	33	13	11	-3.43	+ 4.05	-3.08	+1.74
Missouri Cage - (8/cage) ---------	111	28	16	14	+1.31	+ .28	+8.22	+7.70
Missouri Floor -----------------	88	54	22	27	+1.34	+ .28	+2.96	-1.75
New Hampshire No. 7 - (3/cage) --	120	135	15	17	+3.79	+ 2.62	-1.06	+ .86
New Hampshire No. 4 - Floor-----	24	24	8	8	+3.12	+ .91	-3.00	-1.71
North Carolina No. 3 - Floor -----	40	20	20	10	+2.68	+ 1.32	+3.70	+5.34
North Carolina No. 4 - (2/cage)---	80	40	20	10	+3.78	+ 2.08	- .12	+1.39
North Carolina No. 5 - (7/cage)---	40	20	20	10	+3.49	- 1.78	-1.94	+1.68
Pennsylvania No. 1 - Floor-------	48	48	24	24	+ .04	+ 1.78	+3.66	-1.45
Pennsylvania No. 2 - (3/cage)-----	48	48	24	24	-2.07	+ 1.36	-8.41	-7.51
Tennessee No. 5 - (2/cage) -------	26	28	13	14	+ .11	- 5.92	- .10	+ .22
Tennessee No. 6 - (2/cage) -------	26	28	13	14	- .38	- 6.40	+4.73	+ .73
Tennessee No. 7 - (2/cage) -------	26	28	13	14	+ .04	- 5.99	-3.39	- .97
Tennessee No. 8 - (2/cage) -------	26	28	13	14	+ .04	-17.89	-5.43	-2.78

TABLE 3.--Factors used to adjust for test differences--Continued

Test	Age at 50 percent production (days)		Hen-housed (number)		Hen-day (to end of test) (percent)		Hen-day (last 30-60 days) (percent)	
	1973	1974	1973	1974	1973	1974	1973	1974
Central Canada No. 6 - (2/cage)----	+ 6.19	+ 2.51	-10.23	+ 1.21	-2.16	+ 0.91	- 0.40	- 3.04
Central Canada No. 7 - (2/cage)---	+ .62	+15.05	+ 2.44	+ 2.36	-1.07	+ 1.47	- 2.59	- 4.36
Florida No. 1 - Floor -------------	--	- 4.97	--	- 5.20	--	- 2.15	--	+ 4.13
Florida No. 2 - (2/cage)----------	- 2.99	- 5.20	+ .61	- 6.13	-1.70	- 3.05	- 4.11	+ 1.16
Florida No. 6 - Floor -------------	--	- 3.08	--	- 9.52	--	+ .09	--	- 3.34
Florida No. 5 - (2/cage)----------	+ 4.97	- 6.50	+ 3.24	+11.21	-2.57	+ .34	+ 3.81	+ 3.98
Minnesota No. 1 - Floor----------	+ 7.20	- 2.74	- 4.70	- 6.79	-1.30	- 2.49	+ 4.16	- 2.36
Minnesota No. 4 - (3/cage) -------	+ 5.95	- 7.18	+ 4.04	+ 4.84	+ .23	+ .14	+ 5.45	- .64
Missouri Cage - (8/cage)----------	- 8.45	+ 6.43	+ 5.74	-10.99	-2.24	- 1.34	- 4.57	NR*
Missouri Floor -------------------	-10.75	+ 2.33	+ 6.85	-10.54	+1.43	- 1.98	- .76	NR*
New Hampshire No. 7 - (3/cage) --	+ 8.83	+ 7.84	- 7.58	+20.11	-1.75	+ 7.71	NR*	- 1.68
New Hampshire No. 4 - Floor------	- 3.80	+10.05	+ 3.87	- 1.06	-1.81	+ .04	NR*	+ .62
North Carolina No. 3 - Floor -----	- .84	-18.38	-18.01	+ .05	-2.10	+ 6.22	- 2.36	- 2.71
North Carolina No. 4 - (2/cage)---	+ 3.88	+ .34	-22.52	-24.39	-6.01	- 6.56	- 5.39	- 5.67
North Carolina No. 5 - (7/cage)---	+ 9.38	+ .97	+ .82	+ 7.69	+1.02	+ 3.20	- 3.38	- 6.45
Pennsylvania No. 1 - Floor -------	- .12	- 4.68	-15.20	- 4.70	-2.78	- 2.19	+ 1.41	- 6.99
Pennsylvania No. 2 - (3/cage)-----	- 3.68	- 6.57	+17.20	+ 8.79	+1.35	- .69	+12.39	+10.04
Tennessee No. 5 - (2/cage)--------	-14.59	-15.71	- 7.32	+ 9.60	-2.83	+ 2.71	- .80	- 1.91
Tennessee No. 6 - (2/cage)--------	- 7.07	- 8.19	- 8.50	+ 4.90	-1.25	+ 1.86	+ 2.97	+ 1.40
Tennessee No. 7 - (2/cage)-------	+ 4.93	+ 3.81	- 7.65	+11.89	-2.13	+ 4.64	- 5.09	- 4.48
Tennessee No. 8 - (2/cage)-------	+ 4.93	+21.26	+ 7.16	+31.75	+1.60	+15.08	+ 7.36	+ 8.57

* Data for this trait not reported.

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TABLE 3. --Factors used to adjust for test differences--Continued

Test	Feed per pound of eggs (pounds)		Egg weight (oz./dozen)		Large and extra large eggs (percent)		Albumen quality (Haugh units)	
	1973	1974	1973	1974	1973	1974	1973	1974
Central Canada No. 6 - (2/cage)----	+0.32	+0.23	-0.58	-0.62	-06.27	-09.95	+00.61	-3.65
Central Canada No. 7 - (2/cage)---	+ .06	+ .24	- .63	+1.05	- .69	+28.02	- .02	+ .93
Florida No. 1 - Floor ------------	--	+ .22	--	- .93	--	- 8.92	--	-2.04
Florida No. 2 - (2/cage)----------	+ .25	+ .27	-1.37	-1.24	-15.26	-10.99	+ 7.02	+3.74
Florida No. 6 - Floor ------------	--	- .03	--	- .04	--	- 2.23	--	-2.31
Florida No. 5 - (2/cage)----------	- .15	- .23	+ .11	- .15	+10.58	+ 4.48	+ 1.61	-2.96
Minnesota No. 1 - Floor-----------	- .10	+ .28	+1.00	- .82	+ 4.08	-12.09	+ 2.51	-4.17
Minnesota No. 4 - (3/cage) -------	- .21	- .40	- .43	- .82	+ 5.75	+ .55	- .48	-1.77
Missouri Cage - (8/cage)---------	+ .01	+ .41	- .67	+ .01	-10.10	- 4.40	-13.32	-8.79
Missouri Floor ------------------	- .06	+ .27	- .21	+ .31	- 4.03	- 2.58	-10.33	NR*
New Hampshire No. 7 - (3/cage) --	+ .08	- .35	+ .17	+ .78	+14.75	+12.46	+ 3.57	+1.78
New Hampshire No. 4 - Floor-----	+ .04	+ .23	- .72	+1.03	- 2.50	+28.47	- .54	+ .03
North Carolina No. 3 - Floor -----	- .03	- .04	- .36	- .55	-15.38	-15.33	- 1.89	-1.76
North Carolina No. 4 - (2/cage)---	+ .31	+ .29	- .19	- .54	-10.20	- 6.66	+ 5.45	+2.91
North Carolina No. 5 - (7/cage)---	- .04	- .29	+ .61	+ .95	+15.48	+10.45	+ 2.92	- .17
Pennsylvania No. 1 - Floor -------	- .06	- .48	+ .68	+ .41	- 7.08	- 4.46	- 2.62	+ .12
Pennsylvania No. 2 - (3/cage)-----	+ .04	+ .13	- .97	-1.29	-14.99	-11.24	+ 4.84	+3.40
Tennessee No. 5 - (2/cage)-------	+ .04	+ .03	- .31	- .44	- 9.92	-11.71	- 1.42	-4.82
Tennessee No. 6 - (2/cage)-------	+ .22	+ .29	- .67	- .97	- 9.20	-13.30	- 2.26	-3.95
Tennessee No. 7 - (2/cage)-------	- .15	- .19	+ .94	+ .79	+11.15	+ 6.93	+ 3.81	+1.43
Tennessee No. 8 - (2/cage)-------	- .27	- .99	+1.04	+4.65	+10.11	+45.01	+ .68	+7.23

* Data for this trait not reported.

TABLE 3.--Factors used to adjust for test differences--Continued

Test	Blood spots 1/8 inch or more (percent)		Blood spots less than 1/8 inch (percent)		Meat spots 1/8 inch or more (percent)		Meat spots less than 1/8 inch (percent)	
	1973	1974	1973	1974	1973	1974	1973	1974
Central Canada No. 6 - (2/cage)---	+0.08	-01.21	+1.39	+0.74	+1.15	+1.04	+03.17	+03.16
Central Canada No. 7 - (2/cage)---	-3.35	- 1.70	-1.82	-2.21	-2.44	-2.45	- 3.51	- 3.25
Florida No. 1 - Floor ------------	--	- 1.87	--	+2.48	--	-1.14	--	- 1.63
Florida No. 2 - (2/cage)----------	-2.81	- 2.64	-1.81	- .52	-1.41	-3.52	+ 1.54	- .14
Florida No. 6 - Floor ------------	--	- .46	--	- .07	--	+ .28	--	+ .25
Florida No. 5 - (2/cage)----------	+ .28	- 1.80	+1.00	+ .54	+2.71	+2.34	+ 2.04	+ 1.85
Minnesota No. 1 - Floor----------	+3.26	- 2.75	+ .02	+4.02	+2.15	+ .67	+ 5.05	+ 1.32
Minnesota No. 4 - (3/cage) -------	- .03	+ .99	+ .05	+1.15	+2.52	+2.54	+ 3.07	+ 1.37
Missouri Cage - (8/cage) ---------	+1.45	NR*	+3.25	NR*	+1.38	NR*	+ 2.99	NR*
Missouri Floor -------------------	+1.52	NR*	+4.05	NR*	+1.50	NR*	+ 3.63	NR*
New Hampshire No. 7 - (3/cage) --	+2.39	+ 2.89	+6.93	+5.96	+1.34	-1.02	-11.03	- 7.76
New Hampshire No. 4 - Floor-----	-3.84	- 2.06	-1.89	-1.35	-2.45	-1.76	- 3.60	- 2.80
North Carolina No. 3 - Floor -----	-1.79	- 2.33	-3.89	-3.30	- .69	- .26	+ .80	+ .82
North Carolina No. 4 - (2/cage) ---	-2.22	- 1.39	- .71	+ .51	-2.00	-3.61	+ .98	+ .31
North Carolina No. 5 - (7/cage) ---	+2.31	+ 1.95	+2.52	+7.36	+2.62	- .55	-11.62	-12.34
Pennsylvania No. 1 - Floor -------	+ .37	+ .07	-5.84	-2.04	+ .28	+ .30	- .03	+ 1.26
Pennsylvania No. 2 - (3/cage)-----	-2.67	- 1.45	- .61	+ .31	-1.03	-4.19	+ 1.78	+ .06
Tennessee No. 5 - (2/cage) -------	-1.16	- 1.11	-1.89	- .07	+1.30	+ .43	+ 3.32	+ 3.06
Tennessee No. 6 - (2/cage) -------	- .13	+ 1.14	+1.88	- .13	+ .84	+1.24	+ 2.90	+ 3.61
Tennessee No. 7 - (2/cage) -------	+2.93	+ 2.74	-3.49	+3.27	+ .38	+ .34	+ .71	+ 1.49
Tennessee No. 8 - (2/cage) -------	+2.88	+12.16	+ .70	-6.78	+ .63	+2.57	+ 2.90	+ 9.59

* Data for this trait not reported.

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TABLE 3.--Factors used to adjust for test differences--Continued

Test	Specific gravity score		Body weight (pounds)		Income over feed and chick cost (dollars)	
	1973	1974	1973	1974	1973	1974
Central Canada No. 6 - (2/cage)---	-1.08	-1.85	+0.25	+0.10	+1.56	+0.80
Central Canada No. 7 - (2/cage)---	+ .74	+1.02	- .23	+ .22	+1.57	+ .68
Florida No. 1 - Floor -----------	--	- .07	--	- .11	--	NR*
Florida No. 2 - (2/cage)---------	+1.65	+1.14	- .25	- .08	NR*	NR*
Florida No. 6 - Floor -----------	--	- .26	--	- .07	--	NR*
Florida No. 5 - (2/case)---------	- .64	-1.65	+ .02	- .16	NR*	NR*
Minnesota No. 1 - Floor----------	- .91	-1.66	+ .02	+ .29	+ .35	+1.73
Minnesota No. 4 - (3/cage) ------	- .84	-1.33	+ .04	- .24	+ .56	+1.80
Missouri Cage - (8/cage) --------	- .86	- .39	- .42	- .13	- .22	NR*
Missouri Floor ------------------	- .48	NR*	- .34	- .18	-1.21	- .39
New Hampshire No. 7 - (3/cage) --	+ .89	+ .58	- .21	+ .02	-2.14	-1.33
New Hampshire No. 4 - Floor-----	+ .85	+1.09	- .16	+ .28	-2.82	- .71
North Carolina No. 3 - Floor -----	+ .21	- .09	- .04	- .10	+ .56	+ .03
North Carolina No. 4 - (2/cage) ---	+1.20	+1.15	- .19	+ .04	+1.03	+ .44
North Carolina No. 5 - (7/cage) ---	+1.38	+ .81	- .12	- .08	+1.68	+ .95
Pennsylvania No. 1 - Floor -------	+ .23	+ .59	+ .11	+ .23	-2.08	- .27
Pennsylvania No. 2 - (3/cage)-----	+1.35	+1.11	- .02	+ .18	-1.93	- .92
Tennessee No. 5 - (2/cage) -------	-1.28	-1.41	- .03	+ .30	+ .87	- .90
Tennessee No. 6 - (2/cage) -------	-1.55	-1.29	+ .26	+ .34	+ .97	- .86
Tennessee No. 7 - (2/cage) -------	+ .28	- .01	- .14	+ .22	+ .74	- .82
Tennessee No. 8 - (2/cage) -------	+ .09	+ .49	- .13	+ .33	+1.02	- .92

* Data for this trait not reported.

RANGE GROUP RANKING BASED ON 1973-74 TESTS

How Group Rankings Were Determined for Each Trait

The information in this section deals only with the test data obtained during the 1973-74 test year.

The performance of each entry in the 10 Random Sample Egg Production Tests conducted during 1973-74 is reported as the Range Group Rank of the entry for the trait measured. These rankings were determined in the following manner. For each trait the entries in each test were alined in descending order of performance from the most desirable to the least desirable. The "mean" or average performance for the trait was then determined. All entries above the mean are in range group 1 or 2, and those below the mean are in range group 3 or 4. The dividing point for the entries above or below the mean is the midpoint of the range between the mean and the top or bottom entry. An illustration follows.

Stocks entered in the Pennsylvania test had a mean, or average, of 224.40 eggs for the trait "Egg Production per Hen Housed." The highest average number of eggs laid by an entry in this test was 251.20 and the lowest average number laid by an entry was 170.70 eggs. To arrive at the dividing point between the first and second range groups, the mean (224.40) was subtracted from the highest number of eggs (251.20). The result, 26.80 eggs, was divided by two to get the midpoint of the range (13.40 eggs). This was then subtracted from the highest number of eggs (251.20 minus 13.40) to arrive at the dividing point (237.80 eggs) between the first and second range groups. To determine the dividing point between the third and fourth range groups, the same procedure was used, except that the lowest average number of eggs (170.70) was subtracted from the mean (224.40) This difference, or range, (53.70 eggs) was then divided by two, and the result (26.85 eggs) was subtracted from the mean (224.40 minus 26.85) to get the dividing point (197.55 eggs) between the third and fourth range groups. These determinations for ten traits from each test are tabulated in table 4.

The breeders of the stock tested and the Range Group Ranking, by traits, of each entry of the stock are shown in table 5. Each entry is also identified by the abbreviated name of the entrant. If the sample was drawn from a source other than the entrant's hatchery or supply flock, the abbreviated name of the source of the sample is shown in parentheses following the entrant's name.

The listing of the entries in the four range groups, with all entries of each stock in one table, allows the reader to quickly evaluate a stock based on this method of analysis. It should be kept in mind, however, that this method provides just four broad classifications. One-tenth of an egg or one-tenth of a percent difference in mortality could move an entry up or down one Range Group Rank, depending on its place in the range grouping.

Tabular Listing of Stock Entered in Tests

The listing of all stock entered in the 1973-74 Random Sample Egg Production Tests is given in table 6. This listing will permit the reader to see at a glance the abbreviated name of the breeder of the stock, the strain or trade name of the stock, and the total number of entries of each stock which were tested during 1973-74. The tests in which each stock was entered are also given.

Management and Environmental Conditions at Tests

Some of the more important management and environmental conditions found in the individual tests during the 1973-74 testing year are found in table 7. Other conditions at the various testing stations were undoubtedly different. However, the important consideration is that all entries at a given location were treated as nearly alike as possible.

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TABLE 4.--Upper and lower limits for each range group by traits and tests, 1973-74

Traits measured	Tests			
	Central Canada	Florida	Minnesota	Missouri Cage
Income over feed and chick cost;				
Average -----dol./hen housed-	2.430		1.731	
Range group 1 ---------------	3.270 - 2.850		2.370 - 2.050	
Range group 2 ---------------	2.849 - 2.430	Not Reported	2.049 - 1.731	Not Reported
Range group 3 ---------------	2.429 - 1.725		1.730 - 1.390	
Range group 4 ---------------	1.724 - 1.020		1.389 - 1.050	
Egg production;				
Average --number/hen housed-	223.17	228.18	239.02	222.96
Range group 1 ---------------	244.00 - 233.58	248.60 - 238.39	264.20 - 251.61	247.00 - 234.98
Range group 2 ---------------	233.57 - 223.17	238.38 - 228.18	251.60 - 239.02	234.97 - 222.96
Range group 3 ---------------	223.16 - 211.08	228.17 - 206.34	239.01 - 229.01	222.95 - 208.08
Range group 4 ---------------	211.07 - 199.00	206.33 - 184.50	229.00 - 219.00	208.07 - 193.20
Age at 50 percent production;				
Average ----------------days-	159.6	177.3	168.2	191.6
Range group 1 ---------------	156.0 - 157.8	172.0 - 174.7	162.0 - 165.1	183.0 - 187.3
Range group 2 ---------------	157.9 - 159.6	174.8 - 177.3	165.2 - 168.2	187.4 - 191.6
Range group 3 ---------------	159.7 - 161.8	177.4 - 179.7	168.3 - 175.1	191.7 - 196.8
Range group 4 ---------------	161.9 - 164.0	179.8 - 182.0	175.2 - 182.0	196.9 - 202.0
Growing mortality;				
Average-------------percent-	3.22	3.06	2.29	2.12
Range group 1 ---------------	1.40 - 2.31	1.70 - 2.38	1.00 - 1.65	0 1.06
Range group 2 ---------------	2.32 - 3.22	2.39 - 3.06	1.66 - 2.29	1.07 - 2.12
Range group 3 ---------------	3.23 - 5.11	3.07 - 4.73	2.30 - 3.15	2.13 - 3.31
Range group 4 ---------------	5.12 - 7.00	4.74 - 6.40	3.16 - 4.00	3.32 - 4.50
Laying mortality;				
Average-----------percent-	11.71	7.33	4.92	5.71
Range group 1 ---------------	6.10 - 8.90	3.30 - 5.32	1.40 - 3.16	1.30 - 3.51
Range group 2 ---------------	8.91 - 11.71	5.33 - 7.33	3.17 - 4.92	3.52 - 5.71
Range group 3 ---------------	11.72 - 15.40	7.34 - 11.47	4.93 - 8.51	5.72 - 11.01
Range group 4 ---------------	15.41 - 19.10	11.48 - 15.60	8.52 - 12.10	11.02 - 16.30
Egg weight;				
Average -------ounces/dozen-	24.18	25.66	25.32	25.64
Range group 1 ---------------	26.20 - 25.19	26.40 - 26.03	26.30 - 25.81	27.30 - 26.47
Range group 2 ---------------	25.18 - 24.18	26.02 - 25.66	25.80 - 25.32	26.46 - 25.64
Range group 3 ---------------	24.17 - 23.69	25.65 - 25.13	25.31 - 24.76	25.63 - 24.97
Range group 4 ---------------	23.68 - 23.20	25.12 - 24.60	24.75 - 24.20	24.96 - 24.30
Large and extra large eggs;				
Average-------------percent-	47.27	86.15	81.65	89.95
Range group 1 ---------------	72.10 - 59.68	91.30 - 88.73	86.30 - 83.98	97.40 - 93.68
Range group 2 ---------------	59.67 - 47.27	88.72 - 86.15	83.97 - 81.65	93.67 - 89.95
Range group 3 ---------------	47.26 - 40.13	86.14 - 82.28	81.64 - 76.63	89.94 - 82.38
Range group 4 ---------------	40.12 - 33.00	82.27 - 78.40	76.62 - 71.60	82.37 - 74.80
Feed per pound of eggs;				
Average -------------pounds-	2.483	2.483	2.262	2.722
Range group 1 ---------------	2.320 - 2.402	2.330 - 2.406	2.080 - 2.171	2.500 - 2.611
Range group 2 ---------------	2.403 - 2.483	2.407 - 2.483	2.172 - 2.262	2.612 - 2.722
Range group 3 ---------------	2.484 - 2.677	2.484 - 2.596	2.263 - 2.341	2.723 - 2.981
Range group 4 ---------------	2.678 - 2.870	2.597 - 2.710	2.342 - 2.420	2.982 - 3.240
Albumen quality;				
Average---------Haugh units-	77.75	82.76	87.54	
Range group 1 ---------------	81.80 - 79.78	84.70 - 83.73	90.50 - 89.02	
Range group 2 ---------------	79.77 - 77.75	83.72 - 82.76	89.01 - 87.54	Not Reported
Range group 3 ---------------	77.74 - 76.23	82.75 - 81.43	87.53 - 86.17	
Range group 4 ---------------	76.22 - 74.70	81.42 - 80.10	86.16 - 84.80	
Blood spots, all sizes;				
Average------------percent-	4.31	2.88	1.69	
Range group 1 ---------------	1.60 - 2.95	1.30 - 2.09	0 - 0.85	
Range group 2 ---------------	2.96 - 4.31	2.10 - 2.88	.86 - 1.69	Not Reported
Range group 3 ---------------	4.32 - 8.20	2.89 - 4.24	1.70 - 3.25	
Range group 4 ---------------	8.21 - 12.10	4.25 - 5.60	3.26 - 4.80	

Traits measured	Tests		
	Missouri Floor	New Hampshire Cage	New Hampshire Floor
Income over feed and chick cost;			
Average--------dol./hen housed-	3.501	4.713	3.596
Range group 1-----------------	5.580 - 4.541	5.730 - 5.221	5.390 - 4.493
Range group 2-----------------	4.540 - 3.501	5.220 - 4.713	4.492 - 3.596
Range group 3-----------------	3.500 - 2.406	4.712 - 4.071	3.595 - 2.838
Range group 4-----------------	2.405 - 1.310	4.070 - 3.430	2.837 - 2.080
Egg production;			
Average-----number/hen housed-	224.37	222.48	199.33
Range group 1-----------------	270.10 - 247.24	246.80 - 234.64	236.10 - 217.71
Range group 2-----------------	247.23 - 224.37	234.63 - 222.48	217.70 - 199.33
Range group 3-----------------	224.36 - 206.69	222.47 - 209.54	199.32 - 186.11
Range group 4-----------------	206.68 - 189.00	209.53 - 196.60	186.10 - 172.90
Age at 50 percent production;			
Average-----------------days-	178.7	173.9	171.0
Range group 1-----------------	169.0 - 173.9	157.0 - 165.4	152.0 - 161.5
Range group 2-----------------	174.0 - 178.7	165.5 - 173.9	161.6 - 171.0
Range group 3-----------------	178.8 - 183.4	174.0 - 185.4	171.1 - 175.5
Range group 4-----------------	183.5 - 188.0	185.5 - 197.0	175.6 - 180.0
Growing mortality;			
Average --------------percent-	1.66	3.52	1.75
Range group 1-----------------	.30 - 0.98	0 - 1.76	0 - 0.88
Range group 2-----------------	.99 - 1.66	1.77 - 3.52	.89 - 1.75
Range group 3-----------------	1.67 - 2.68	3.53 - 8.91	1.76 - 3.88
Range group 4-----------------	2.69 - 3.70	8.92 - 14.30	3.89 - 6.00
Laying mortality;			
Average --------------percent-	11.35	6.12	5.68
Range group 1-----------------	2.50 - 6.92	1.60 - 3.86	2.20 - 3.94
Range group 2-----------------	6.93 - 11.35	3.87 - 6.12	3.95 - 5.68
Range group 3-----------------	11.36 - 17.57	6.13 - 9.31	5.69 - 10.04
Range group 4-----------------	17.58 - 23.80	9.32 - 12.50	10.05 - 14.40
Egg weight;			
Average ----------ounces/dozen-	25.04	24.93	25.68
Range group 1-----------------	27.40 - 26.22	26.50 - 25.71	26.50 - 26.09
Range group 2-----------------	26.21 - 25.04	25.70 - 24.93	26.08 - 25.68
Range group 3-----------------	25.03 - 24.17	24.92 - 24.46	25.67 - 25.29
Range group 4-----------------	24.16 - 23.30	24.45 - 24.00	25.28 - 24.90
Large and extra large eggs;			
Average ---------------percent-	82.07	69.61	75.61
Range group 1-----------------	94.40 - 88.24	87.70 - 78.66	83.40 - 79.51
Range group 2-----------------	88.23 - 82.07	78.65 - 69.61	79.50 - 75.61
Range group 3-----------------	82.06 - 72.99	69.60 - 62.21	75.60 - 69.16
Range group 4-----------------	72.98 - 63.90	62.20 - 54.80	69.15 - 62.70
Feed per pound of eggs;			
Average ----------------pounds-	3.249	3.028	3.335
Range group 1-----------------	2.810 - 3.029	2.660 - 2.843	2.680 - 3.008
Range group 2-----------------	3.030 - 3.249	2.844 - 3.028	3.009 - 3.335
Range group 3-----------------	3.250 - 3.659	3.029 - 3.149	3.336 - 3.598
Range group 4-----------------	3.660 - 4.070	3.150 - 3.270	3.599 - 3.860
Albumen quality;			
Average ----------- Haugh units-		79.74	78.29
Range group 1-----------------		84.60 - 82.17	82.70 - 80.49
Range group 2-----------------	Not Reported	82.16 - 79.74	80.48 - 78.29
Range group 3-----------------		79.73 - 78.07	78.28 - 76.64
Range group 4-----------------		78.06 - 76.40	76.63 - 75.00
Blood spots, all sizes;			
Average --------------percent-		0.99	2.36
Range group 1-----------------		0 - 0.49	0 - 1.18
Range group 2-----------------	Not Reported	.50 - .99	1.19 - 2.36
~~oup 3-----------------		1.00 - 2.59	2.37 - 5.38
~up 4-----------------		2.60 - 4.20	5.39 - 8.40

Traits measured	Tests		
	North Carolina	Pennsylvania	Tennessee
Income over feed and chick cost;			
Average ------- dol. /hen housed-	2.710	3.908	4.069
Range group 1-------------------	3.520 - 3.115	5.550 - 4.729	4.790 - 4.430
Range group 2-------------------	3.114 - 2.710	4.728 - 3.908	4.429 - 4.069
Range group 3-------------------	2.709 - 2.205	3.907 - 2.774	4.068 - 3.420
Range group 4-------------------	2.204 - 1.700	2.773 - 1.640	3.419 - 2.770
Egg production;			
Average ---- number/hen housed-	229.18	224.40	208.77
Range group 1-------------------	258.50 - 243.84	251.20 - 237.80	228.00 - 218.39
Range group 2-------------------	243.83 - 229.18	237.79 - 224.40	218.38 - 208.77
Range group 3-------------------	229.17 - 214.99	224.39 - 197.55	208.76 - 188.99
Range group 4-------------------	214.98 - 200.80	197.54 - 170.70	188.98 - 169.20
Age at 50 percent production;			
Average ------------------days-	177.1	181.0	168.2
Range group 1-------------------	166.0 - 171.6	173.0 - 177.0	165.0 - 166.6
Range group 2-------------------	171.7 - 177.1	177.1 - 181.0	166.7 - 168.2
Range group 3-------------------	177.2 - 187.1	181.1 - 187.5	168.3 - 172.6
Range group 4-------------------	187.2 - 197.0	187.6 - 194.0	172.7 - 177.0
Growing mortality;			
Average--------------- percent-	2.28	0.93	7.75
Range group 1-------------------	1.10 - 1.69	0 - 0.47	0 - 3.88
Range group 2-------------------	1.70 - 2.28	.48 - .93	3.89 - 7.75
Range group 3-------------------	2.29 - 3.39	.94 - 1.67	7.76 - 11.38
Range group 4-------------------	3.40 - 4.50	1.68 - 2.40	11.39 - 15.00
Laying mortality;			
Average --------------- percent-	10.55	6.57	11.30
Range group 1-------------------	5.20 - 7.88	1.50 - 4.03	5.00 - 8.15
Range group 2-------------------	7.89 - 10.55	4.04 - 6.57	8.16 - 11.30
Range group 3-------------------	10.56 - 14.68	6.58 - 10.68	11.31 - 14.00
Range group 4-------------------	14.69 - 18.80	10.69 - 14.80	14.01 - 16.70
Egg weight;			
Average ----------ounces/dozen-	26.49	26.18	24.51
Range group 1-------------------	27.80 - 27.15	28.80 - 27.49	26.00 - 25.25
Range group 2-------------------	27.14 - 26.49	27.48 - 26.18	25.24 - 24.51
Range group 3-------------------	26.48 - 25.50	26.17 - 25.24	24.50 - 23.75
Range group 4-------------------	25.49 - 24.50	25.23 - 24.30	23.74 - 23.00
Large and extra large eggs;			
Average --------------- percent-	88.27	77.12	69.71
Range group 1-------------------	95.80 - 92.04	90.00 - 83.56	82.10 - 75.91
Range group 2-------------------	92.03 - 88.27	83.55 - 77.12	75.90 - 69.71
Range group 3-------------------	88.26 - 83.19	77.11 - 65.81	69.70 - 60.16
Range group 4-------------------	83.18 - 78.10	65.80 - 54.50	60.15 - 50.60
Feed per pound of eggs;			
Average ----------------pounds-	2.573	3.015	2.914
Range group 1-------------------	2.320 - 2.447	2.560 - 2.788	2.730 - 2.822
Range group 2-------------------	2.448 - 2.573	2.789 - 3.015	2.823 - 2.914
Range group 3-------------------	2.574 - 2.832	3.016 - 3.223	2.915 - 3.127
Range group 4-------------------	2.833 - 3.090	3.224 - 3.430	3.128 - 3.340
Albumen quality;			
Average ----------- Haugh units-	76.13	82.43	78.58
Range group 1-------------------	79.10 - 77.62	86.40 - 84.41	85.00 - 81.79
Range group 2-------------------	77.61 - 76.13	84.40 - 82.43	81.78 - 78.58
Range group 3-------------------	76.12 - 74.72	82.42 - 80.01	78.57 - 76.59
Range group 4-------------------	74.71 - 73.30	80.00 - 77.60	76.58 - 74.60
Blood spots, all sizes;			
Average --------------- percent-	3.36	3.19	4.64
Range group 1-------------------	1.50 - 2.43	1.40 - 2.29	1.30 - 2.97
Range group 2-------------------	2.44 - 3.36	2.30 - 3.19	2.98 - 4.64
Range group 3-------------------	3.37 - 4.33	3.20 - 4.89	4.65 - 9.82
Range group 4-------------------	4.34 - 5.30	4.90 - 6.60	9.83 - 15.00

TABLE 5.—Range group ranking for stock entered in 1973-74 random sample egg production tests

ENTRY IDENTIFICATION	TEST	BREEDING		STRAIN OR TRADENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (No.) (Hen housed)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
Animal Research Institute, Central Experimental Farm, Ottawa, Ontario, Canada.														
A.R.I., Ont. ------	C.C.	WL	PS	Kentville, R.B.C.--	4	4	4	4	2	4	4	4	4	3
Anthony, George M. & Sons, Strausstown, Pennsylvania 19559.														
Anthony, Pa. ---	Mo.-C.	WL	SX	Anthony -------	–	4	3	4	4	3	3	3	–	–
Anthony, Pa. ---	Mo.-F.	WL	SX	Anthony -------	3	3	3	3	2	3	3	3	–	–
Anthony, Pa. ---	Pa.	WL	SX	Anthony -------	2	3	2	3	3	3	3	2	2	3
Anthony, Pa. ---	Tenn.	WL	SX	Anthony -------	3	3	4	4	3	3	2	1	2	2
Babcock Poultry Farm, Inc., P.O. Box 280, Ithaca, New York 14850.														
Babcock, N.Y. (Last Mt., Sask.) ------	C.C.	WL	IN	Babcock B-300 ----	1	1	2	2	1	2	1	1	2	3
Babcock, N.Y. ------	Fla.	WL	IN	Babcock B-300 ----	–	1	1	2	1	2	2	1	4	1
Babcock, N.Y. ------	Minn.	WL	IN	Babcock B-300 ----	2	2	1	3	3	1	2	2	4	3
Babcock, N.Y. (Ballew, Mo.) ------	Mo.-C.	WL	IN	Babcock B-300 ----	–	1	2	3	1	2	1	1	–	–
Babcock, N.Y. (Ballew, Mo.) ------	Mo.-F.	WL	IN	Babcock B-300 ----	2	1	1	2	2	2	2	1	–	3
Babcock, N.Y. ------	N.H.-C.	WL	IN	Babcock B-300 ----	1	1	1	1	3	3	2	1	4	3
Babcock, N.Y. ------	N.H.-F.	WL	IN	Babcock B-300 ----	1	1	1	2	3	4	4	1	4	4
Babcock, N.Y. (Beamsdale, N.C.) ----	N.C.	WL	IN	Babcock B-300 ----	1	2	1	1	3	2	2	1	3	3
Babcock, N.Y. (Babcock, Pa.) ------	Pa.	WL	IN	Babcock B-300 ----	3	2	1	1	3	2	2	3	3	2
Babcock, N.Y. ------	Tenn.	WL	IN	Babcock B-300 -----	1	1	2	2	2	2	2	1	4	1
Babcock Poultry Farm, Inc., P.O. Box 280, Ithaca, New York 14850.														
Babcock, N.Y. ------	Mo.-C.	WL	IN	Babcock B-303 ----	–	3	3	1	3	2	2	2	–	–
Babcock Poultry Farm, Inc., P.O. Box 280, Ithaca, New York 14850.														
Babcock, N.Y. ------	Mo.-F.	RIRxSYNBX		Babcock B-380 ----	3	2	2	1	4	1	1	3	–	–
Babcock, N.Y. ------	N.H.-C.	RIRxSYNBX		Babcock B-380 ----	1	2	3	2	3	2	2	3	2	1
*Babcock, N.Y. ------	N.C.	RIRxSYNBX		Babcock B-380 ----	3	2	4	2	1	1	1	3	1	1
Babcock, N.Y. ------	Pa.	RIRxSYNBX		Babcock B-380 ----	3	3	2	2	2	2	1	3	2	3
Canada Department of Agriculture, Poultry Division, Ottawa, Ontario, Canada.														
Canada D.A., Ont. ------	C.C.	WL		Syn.P.D. 58 ------	1	2	1	3	1	4	4	1	1	1
Carey Farms, 3252 Mt. Olive, Agosta Road, Marion, Ohio 43302.														
Carey, Ohio------	Minn.	WL	IN	Carey Nick 300-----	2	3	4	1	1	1	1	2	3	1

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TABLE 5.--Range group ranking for stock entered in 1973-74 random sample egg production tests--Continued

ENTRY IDENTIFICATION	TEST	BREEDING	STRAIN OR TRADENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (lien housed) (No.)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
Carey Farms, 3252 Mt. Olive, Agosta Road, Marion, Ohio 43302.													
Carey, Ohio--------	Mo.-F.	WL	IN	Carey Nick 310--	2	2	4	3	2	2	2	2	–	–
Carey, Ohio--------	Pa.	WL	IN	Carey Nick 310--	2	1	3	1	1	3	3	2	3	1
Colonial Poultry Farm, Inc., Pleasant Hill, Missouri 64080.													
Colonial, Mo. ------------	Fla.	WL	IN	True-Line 365 B-	–	3	1	1	1	3	3	1	3	2
Colonial, Mo. (Ossenbrink, Mo.)----	Mo.-C.	WL	IN	True-Line 365 B-	–	2	1	3	1	3	2	1	–	–
Colonial, Mo. (Research Farm, Mo.)----	Mo.-F	WL	IN	True-Line 365 B-	2	4	4	4	3	4	3	1	–	–
Colonial, Mo. ------------	Pa.	WL	IN	True-Line 365 B-	1	1	1	3	1	3	3	1	4	3
Colonial Poultry Farm, Inc., Pleasant Hill, Missouri 64080.													
Colonial, Mo. ------------	Mo.-C.	WL	IN	True-Line 365 H-	–	3	2	3	2	3	3	1	–	–
Colonial Poultry Farm, Inc., Pleasant Hill, Missouri 64080.													
Colonial, Mo. ------------	Mo.-C.	WL	IN	True-Line 365 K-	–	3	1	2	2	3	3	1	–	–
Colonial, Mo. (Ossenbrink, Mo.)----	Mo.-F.	WL	IN	True-Line 365 K-	2	2	2	4	1	3	3	1	–	–
Colonial Poultry Farm, Inc., Pleasant Hill, Missouri 64080.													
Colonial, Mo. ------------	C.C.	WL	IN	True-Line 365 S-	2	3	2	1	2	3	3	1	3	2
Colonial, Mo. ------------	Minn.	WL	IN	True-Line 365 S-	2	2	1	1	2	3	3	2	3	3
Colonial, Mo. ------------	Mo.-F.	WL	IN	True-Line 365 S-	1	2	2	3	1	3	3	1	–	1
Colonial, Mo. ------------	N.H.-C.	WL	IN	True-Line 365 S-	3	3	1	1	4	4	4	2	3	3
Colonial, Mo. ------------	Tenn.	WL	IN	True-Line 365 S-	2	3	3	4	2	3	3	1	3	1
Colonial Poultry Farm, Inc., Pleasant Hill, Missouri 64080.													
Colonial, Mo. ------------	Mo.-F.	RIR	PS	Colonial RIR -----	4	4	3	3	4	3	3	4	–	–
Davis, Joe K., Hatchery, P.O. Box 27, Earl, North Carolina 28038.													
Davis, N.C.------------	Mo.-F.	RIRxBPR	BX	Davis Combiner-	4	4	3	3	1	2	1	4	–	–
Davis, N.C.------------	N.H.-C.	RIRxBPR	BX	Davis Combiner-	4	4	3	1	2	2	2	4	4	4
Davis, N.C.------------	N.H.-F.	RIRxBPR	BX	Davis Combiner-	4	4	3	3	3	3	3	4	4	1
Davis, N.C.------------	N.C.	RIRxBPR	BX	Davis Combiner-	4	4	4	4	3	1	1	4	3	3

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TABLE 5.--Range group ranking for stock entered in 1973-74 random sample egg production tests--Continued

ENTRY IDENTIFICATION	TEST	BREEDING		STRAIN OR TRADENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (No.) (litter housed)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
Euribrid B. V. Boxmeer, Holland														
Euribrid, Holland (Euribrid, Belgium)----	Mo.-C.	WL	SX	Hisex White-----	-	1	3	2	4	2	2	2	-	-
Euribrid, Holland ----	N.H.-C.	WL	SX	Hisex White-----	2	2	3	1	1	4	4	2	3	3
Euribrid, Holland (Euribrid, Belgium)----	Pa.	WL	SX	Hisex White-----	1	1	1	1	2	3	3	1	4	2
Fisher Poultry Farm, Ltd., Ayton, Ontario, Canada.														
Fisher, Ont.	C.C.	WL	SX	Fisher 107-----	2	2	1	2	3	2	2	3	4	2
Fisher, Ont.	Minn.	WL	SX	Fisher 107-----	3	3	4	3	2	3	2	3	4	4
Fisher, Ont. (Bieman, Ont.)	Mo.-C.	WL	SX	Fisher 107-----	-	4	3	2	2	2	2	2	-	-
Fisher, Ont.	Mo.-F.	WL	SX	Fisher 107-----	4	3	2	3	3	2	2	4	-	-
Fisher, Ont.	N.H.-C.	WL	SX	Fisher 107-----	4	4	4	3	4	3	2	3	3	1
Fisher, Ont.	Tenn.	WL	SX	Fisher 107-----	2	2	2	2	3	2	2	2	4	2
Garber Poultry Breeding Farm, 4255 Hammett Road, Modesto, California 95351.														
Garber, Calif.	Fla.	WL	SX	Garber G 200 ----	-	3	4	4	2	4	4	4	1	2
Garber, Calif.	Minn.	WL	SX	Garber G 200 ----	3	4	3	2	3	4	4	4	1	1
Garber, Calif.	Mo.-C.	WL	SX	Garber G 200 ----	-	3	3	3	2	3	3	3	-	-
Garber, Calif.	Mo.-F.	WL	SX	Garber G 200 ----	3	4	3	2	3	4	4	3	-	-
Garber, Calif.	Pa.	WL	SX	Garber G 200 ----	2	3	2	4	4	4	4	2	2	1
Harco Farms, Bay Road, South Easton, Massachusetts 02375.														
Harco, Mass.	N.H.-C.	RIRxBPR	BX	Harco Sex Link---	3	3	3	3	1	1	1	4	1	1
Harco, Mass.	N.H.-F.	RIRxBPR	BX	Harco Sex Link---	2	2	3	1	1	1	1	2	1	1
Hardy, C. Nelson & Son, Essex, Massachusetts 01929.														
Hardy, Mass.	N.H.-F.	RIRxBPR	BX	Deluxe Sex Link--	3	3	4	1	2	2	1	3	3	3
Hubbard Farms, Inc., Walpole, New Hampshire 03608.														
Hubbard, N.H.	N.H.-C.	SYNxN.H.	BX	Golden Comet----	3	3	1	4	1	2	3	4	4	3
Hubbard, N.H.	N.C.	SYNxN.H.	BX	Golden Comet----	2	2	2	1	2	1	1	2	3	2
Hubbard, N.H.	Pa.	SYNxN.H.	BX	Golden Comet----	3	3	2	1	3	2	1	4	3	2
Ideal Poultry Breeding Farms, P.O. Box 591, Cameron, Texas 76520.														
Ideal, Texas	Fla.	SYNxWL	BX	Ideal 236 ----	-	3	2	3	2	1	2	2	4	3
Ideal, Texas	Minn.	SYNxWL	BX	Ideal 236 ----	3	3	1	2	3	3	1	3	4	1
Ideal, Texas	Mo.-F.	SYNxWL	BX	Ideal 236 ----	2	2	2	1	3	2	2	1	-	.
Ideal, Texas	Pa.	SYNxWL	BX	Ideal 236 ----	1	2	2	2	2	2	2	1	4	1
Ideal, Texas	Tenn.	SYNxWL	BX	Ideal 236 ----	1	1	2	2	4	2	2	1	4	3

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TABLE 5.--Range group ranking for stock entered in 1973-74 random sample egg production tests--Continued

ENTRY IDENTIFICATION	TEST	BREEDING		STRAIN OR TRADENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (Hen housed) (No.)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz.)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs.)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
Indiana Farm Bureau Coop., 2435 Kentucky Avenue, Indianapolis, Indiana 46204.														
Indiana Farm Bureau, Ind.	Mo.-C.	WL	SX	Duchess 60	—	4	2	4	4	3	3	3	—	—
Indiana Farm Bureau, Ind.	Mo.-F.	WL	SX	Duchess 60	2	2	2	3	2	4	3	1	—	—
Indiana Farm Bureau, Ind.	Pa.	WL	SX	Duchess 60	1	1	2	1	3	4	4	2	1	1
Indiana Farm Bureau, Ind.	Tenn.	WL	SX	Duchess 60	2	2	1	2	4	3	3	2	1	1
Kath Line of Canada, Box 415, Aldergrove, British Columbia, Canada														
Kreigers, B.C.	C.C.	WL	SX	Kath Line H 63	3	4	3	1	4	2	2	3	3	2
Lawton Farms, 70 North Street, Foxboro, Massachusetts 02035.														
Lawton, Mass.	N.H.-F.	RIRxWPR	BX	Buff Sex Link	4	4	4	4	1	2	1	4	2	2
Missouri Valley Hatchery, Marshall, Missouri 65340.														
Missouri Valley, Mo.	Mo.-F.	WL	SX	Valley Queen	3	3	4	2	3	3	3	2	—	—
North Central Regional Poultry Breeding Lab., Purdue University, Lafayette, Indiana 47907.														
N.C. Reg. Plty., Ind.	N.C.	WL	SX	Kentville-Cornell	4	4	3	4	3	4	4	4	4	4
N.C. Reg. Plty., Ind.	Tenn.	WL	SX	Kentville-Cornell	4	3	4	2	2	4	4	4	3	3
North Central Regional Poultry Breeding Lab., Purdue University, Lafayette, Indiana 47907.														
N.C. Reg. Plty., Ind.	Mo.-C.	WL	PS	Reg. Cornell Contr.	—	4	4	3	3	4	4	4	—	—
N.C. Reg. Plty., Ind.	Mo.-F.	WL	PS	Reg. Cornell Contr.	3	3	4	3	2	4	4	3	—	—
Parks Poultry Farm, Route 4, Box 118, Altoona, Pennsylvania 16601.														
Parks, Pa.	Fla.	WL	SX	Keystone B-1	—	2	3	4	3	1	1	3	1	3
Parks, Pa.	Minn.	WL	SX	Keystone B-1	3	2	3	4	2	4	4	3	1	1
Parks, Pa.	N.H.-C.	WL	SX	Keystone B-1	3	3	3	1	3	4	4	3	1	1
Parks, Pa.	Tenn.	WL	SX	Keystone B-1	3	3	1	4	2	4	4	3	2	3
Parks Poultry Farm, Route 4, Box 118, Altoona, Pennsylvania 16601.														
Parks, Pa.	Mo.-F.	RIRxWPR	BX	Sil-Go-Links	4	4	4	1	3	1	1	4	—	—
Parks, Pa.	Pa.	RIRxWPR	BX	Sil-Go-Links	4	4	4	1	4	1	1	4	2	3

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TABLE 5.—Range group ranking for stock entered in 1973-74 random sample egg production tests—Continued

ENTRY IDENTIFICATION	TEST	BREEDING	STRAIN OR TRADENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (No.) (Hen housed)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
Shaver Poultry Breeding Farm, Box 400, Galt-Cambridge, Ontario, Canada.													
Shaver, Ont. -----	C.C.	WL	SX	Starcross 288 -----	1	1	3	-	-	-	2	-	-	1
Shaver, Ont. -----	Fla.	WL	SX	Starcross 288 -----	-	1	2	1	1	2	1	1	1	2
Shaver, Ont. -----	Mo.-C.	WL	SX	Starcross 288 -----	-	1	2	2	1	1	1	1	1	-
Shaver, Ont. -----	Mo.-F.	WL	SX	Starcross 288 -----	1	1	2	2	1	1	1	1	-	1
Shaver, Ont. -----	N.H.-C.	WL	SX	Starcross 288 -----	2	2	2	-	3	2	2	3	3	-
Shaver, Ont. (Delta, Fla.)	N.C.	WL	SX	Starcross 288 -----	1	1	2	1	1	2	1	1	3	1
Shaver, Ont. -----	Pa.	WL	SX	Starcross 288 -----	1	1	3	3	2	3	3	1	3	2
Shaver, Ont. -----	Tenn.	WL	SX	Starcross 288 -----	1	1	2	3	1	2	2	1	2	1
Shaver Poultry Breeding Farm, Box 400, Galt-Cambridge, Ontario, Canada.													
Shaver, Ont. -----	C.C.	RIR	SX	Starcross 579 -----	4	4	4	3	2	1	1	4	2	4
Shaver, Ont. -----	Mo.-F.	RIR	SX	Starcross 579 -----	2	2	2	2	1	1	1	2	-	-
St. Augustin Coop. Hatchery, St. Augustin, Quebec, Canada.													
Couvoir Coop., Quebec -----	C.C.	WL	SX	Corvette A 1 -----	3	4	3	3	4	4	4	2	1	1
Tatum Farms, Route 3, Dawsonville, Georgia 30534.													
Tatum, Ga. -----	Fla.	WL	SX	Tatum T-100 -----	-	3	3	1	4	3	2	3	1	4
Tatum, Ga. -----	Minn.	WL	SX	Tatum T-100 -----	3	2	1	3	2	3	1	3	1	4
Tatum, Ga. -----	Mo.-F.	WL	SX	Tatum T-100 -----	2	2	2	3	2	3	3	1	-	-
Tatum, Ga. -----	Pa.	WL	SX	Tatum T-100 -----	2	1	2	4	2	3	2	2	3	3
Tatum, Ga. -----	Tenn.	WL	SX	Tatum T-100 -----	2	1	2	2	3	2	2	2	2	3
Tatum Farms, Route 3, Dawsonville, Georgia 30534.													
Tatum, Ga. -----	Mo.-F.	RIRxSYN	BX	Tatum T-173 -----	2	2	2	1	1	1	1	2	-	-
Tatum, Ga. -----	N.H.-C.	RIRxSYN	BX	Tatum T-173 -----	3	3	1	1	3	2	3	3	4	1
Tatum, Ga. -----	N.H.-F.	RIRxSYN	BX	Tatum T-173 -----	1	2	1	1	4	2	3	1	3	3
Tatum, Ga. -----	Pa.	RIRxSYN	BX	Tatum T-173 -----	4	3	2	1	3	2	1	4	3	2
Tatum, Ga. -----	Tenn.	RIRxSYN	BX	Tatum T-173 -----	3	2	1	1	1	1	1	3	3	4
Thornbers Poultry Breeding Department, Mytholmyroyd, Halifax, Yorkshire, England.													
Thornber, England (Durance, Ont.) -----	C.C.	WL	SX	Thornber 808 -----	2	1	2	1	2	4	4	2	4	1
Thornber, England (Wilpstra, Ont.) -----	Mo.-C.	WL	SX	Thornber 808 -----	-	1	3	2	1	3	3	2	-	-
Thornber, England (Durance, Ont.) -----	Mo.-F.	WL	SX	Thornber 808 -----	2	2	4	4	3	3	3	2	-	-

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TABLE 5.--Range group ranking for stock entered in 1973-74 random sample egg production tests--Continued

ENTRY IDENTIFICATION	TEST	BREEDING	STRAIN OR TRADENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (No.) (Hen housed)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
Welp's Poultry Breeding Farm, Box 366, Bancroft, Iowa 50517.													
Welp, Iowa------------------	Mo.-F.	RIR	SX	Welp Line 650 N-	3	2	1	1	3	2	2	3	-	-
Welp, Iowa------------------	N.H.-C.	RIR	SX	Welp Line 650 N-	3	2	2	1	1	2	2	4	3	1
Welp's Poultry Breeding Farm, Box 366, Bancroft, Iowa 50517.													
Welp, Iowa------------------	Mo.-F.	WL	IN	Welp Line 971---	3	3	1	3	4	3	3	3	-	-
Welp, Iowa------------------	Tenn.	WL	IN	Welp Line 971---	3	3	2	3	3	3	3	23	3	2
Welp's Poultry Breeding Farm, Box 366, Bancroft, Iowa 50517.													
Welp, Iowa------------------	Fla.	WL	IN	Welp Line 973---	-	4	3	4	4	3	3	4	4	4
Welp, Iowa------------------	Mo.-F.	WL	IN	Welp Line 973---	3	4	2	4	4	3	3	3	-	-
Welp, Iowa------------------	Tenn.	WL	IN	Welp Line 973---	4	4	1	2	4	3	3	4	4	1

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RANDOM SAMPLE EGG PRODUCTION TEST ENTRIES AND CONDITIONS, 1973-74

TABLE 6.--Stock entered in 1973-74 tests

Breeder	Code	Strain or trade name	Number of entries	Tests entered									
				C.C.	Fla.	Minn.	Mo.-C.	Mo.-F.	N.H.-C.	N.H.-F.	N.C.	Pa.	Tenn.
Animal Res. Inst.	570	Kentville, R.B.C.	1	X									
Anthony	10	Anthony Leghorn	4			X	X	X				X	X
Babcock	307	Babcock B-300	10	X	X	X	X	X	X	X	X	X	X
Babcock	443	Babcock B-303	1				X						
Babcock	442	Babcock B-380	4					X	X		X	X	
Canada Dept. of Agri.	982	P.D. 58	1	X									
Carey	446	Carey Nick 300	1			X							
Carey	437	Carey Nick 310	2				X	X				X	
Colonial	289	True-Line 365 B	4		X		X	X				X	
Colonial	392	True-Line 365 H	1				X						
Colonial	431	True-Line 365 K	2				X	X					
Colonial	432	True-Line 365 S	5	X		X		X	X				X
Colonial	439	True-Line RIR	1					X					
Davis	309	Davis Combiner	4					X	X	X	X		
Euribrid	447	Hisex White	3				X		X			X	
Fisher	607	Fisher 107	6	X		X	X	X	X			X	
Garber	66	Garber G 200	5		X	X	X	X				X	
Harco	225	Harco Sex Link	2						X	X			
Hardy	86	Deluxe Sex Link	1							X			

TABLE 6.--Stock entered in 1973-74 tests--Continued

Stock Code	Strain or trade name	Breeder	Number of entries	C.C.	Fla.	Minn.	Mo.-C.	Mo.-F	N.H.-C.	N.H.-F.	N.C.	Pa.	Tenn.
378	Golden Comet	Hubbard	3						X		X	X	X
356	Ideal 236	Ideal	5		X	X		X				X	X
234	Duchess 60	Ind. Farm Bureau	4				X	X				X	X
589	Kath-Line H-63	Kath	1	X									
117	Buff Sex Link	Lawton	1							X			
450	Valley Queen	Missouri Valley	1					X					
409	Kentville-Cornell	N. Cent. Reg. Lab.	2								X	X	X
37	Reg. Cornell Control	N. Cent. Reg. Lab.	2				X	X					
352	Parks Keystone B-1	Parks	4		X	X		X	X				X
382	Parks Sil-Go-Link	Parks	2					X				X	
181	Shaver Starcross 288	Shaver	8	X	X		X	X	X		X	X	X
451	Shaver Starcross 579	Shaver	2	X				X					
566	Corvette A-1	St. Augustin	1	X									
401	Tatum T-100	Tatum	5		X	X		X	X			X	X
449	Tatum T-173	Tatum	5					X	X	X		X	X
407	Thornber 808	Thornber	3	X			X	X					
440	Welp Line 650N	Welp	2					X	X				
430	Welp Line 971	Welp	2					X					X
448	Welp Line 973	Welp	3		X			X					X

TABLE 7.--Management, rations, laying house environment, and vaccination provided by tests, 1973-74

Test	Hatched	Age at housing (days)	Length of test (days)	Entries (number)	Replications Number	Replications Birds per rep.	Housing management Brooding	Housing management Rearing	Housing management Laying [1]	Sq. feet per bird
Cent. Canada -----	3/27/73	147	497	12	4	65	Litter	Litter	Cage-2	0.45
					4	65	Litter	Litter	Cage-2	.45
Florida ----------	6/ 3/73	150	486	12	4	24	Litter	Litter	Cage-2	.4
					8	75	Litter	Litter	Litter	1.92
Minnesota --------	3/27/73	150	500	11	3	99	Litter	Litter	Cage-3	.33
				10	1	100	Litter	Litter	Litter	1.5
Missouri Cage ----	9/ 9/72	151	500	14	2	40	Litter	Litter	Cage-2	.67
					4	40	Litter	Litter	Cage-8	.58
Missouri Floor ---	3/ 3/73	151	500	27	4	60	Litter	Litter	Litter	1.6
New Hampshire Cage -----------	5/ 1/73	150	502	17	8	24	Litter	Litter Cage	Cage-3	.5
New Hampshire Floor-----------	5/ 1/73	150	502	8	3	30	Litter	Litter	Litter	3.2
North Carolina----	3/23/73	150	500	10	2	50	Litter	Litter	Litter-slat	1.7
					2	50	Colony cage	Colony cage	Colony cage-7	.5
					4	26	Colony cage	Colony cage	Cage-2	.6
Pennsylvania -----	4/23/73	150	500	24	2	48	Litter	Litter	Cage-3	.5
					2	50	Litter	Litter	Litter	1.7
Tennessee--------	3/27/73	140	500	14	8	30	Litter	Litter	Cage-2	.45

1/ The numerals after the word "cage" refer to the number of birds per cage.

TABLE 7. --Management, rations, laying house environment, and vaccination provided by tests, 1973-74
Continued

Test	Entries brooded inter-mingled	Min. oz./doz. for large eggs	Protein (percent)			Metab. energy 2/ (calories/pound)			MC/Cr. Prot. 3/		
			Start	Grow	Lay	Start	Grow	Lay	Start	Grow	Lay
Cent. Canada - Test--- Control Ration ------	No	24	14.7	10.5	16.9	1270	1290	1300	80.9	124.0	76.5
			20.3	16.2	16.9	1270	1290	1300	58.0	79.1	76.9
Florida --------------	Yes	23		9.1			1480			162.6	
			22.0	15.3	16.5	1340	1371	1313	60.9	78.8	77.7
Minnesota -----------	Yes	23	20.2	15.2	17.5	1268	1215	1310	63.0	80.0	74.9
Missouri Cage --------	No	23	20.7	16.2	18.2	1318	1266	1250	63.7	78.1	68.7
					15.1			1224			81.1
Missouri Floor -------	No	23	20.7	16.2	17.0	1318	1266	1281	63.7	78.1	75.3
					15.1			1305			86.4
New Hampshire -------	Yes	23.5	20.9	16.0	18.5 to 15.5	1340	1319	1255 to 1337	64.0	82.0	72.0 to 81.0
North Carolina--------	No	23	20.0	16.0	18.0 to 16.0	1249	1238	1303 to 1335	62.4	77.4	71.2 to 80.9
Pennsylvania ---------	Yes	24	21.0	17.0	18.0	1300 4/	1357 4/	1354 4/	61.9	79.8	75.2
Tennessee--------------	No	23	20.8	16.5	16.9 5/	1365	1382	1305	65.6	84.0	77.3
			20.8	9.0	16.9 5/	1365	1443	1305	65.6	159.0	77.3

2/ Metabolizable energy is the maximum quantity of feed energy that possibly may be used by the chicken.

3/ Metabolizable calories divided by percent crude protein.

4/ Approximate metabolizable energy computed from productive energy, using 70 percent as the conversion factor.

5/ See Tennessee Test Report for complete ration combinations.

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TABLE 7.--Management, rations, laying house environment, and vaccination provided by tests, 1973-74
Continued

Test	Lighting		Artificial heat used	R Value of insulation material 6/		Ventilation
	Rearing (hours)	Laying (hours)				
Cent. Canada -----	(7/)	(8/)	Yes	Ceiling Walls	27.9 15.1	Exhaust fans in roof and in east wall.
Florida ----------	Natural	15	No	Cage Summer House Winter	13.0 8.0	Natural ridge vents
Minnesota Cage ---	12	12 to 16	No	Ceiling Walls	15.8 12.1	Positive pressure
Minnesota Floor --	Natural	12 to 16	No	Ceiling Walls	15.0 13.0	Exhaust fans
Missouri Cage ----	10	16	No	Ceiling Walls	5.8 None	Ridge vents
Missouri Floor ---	Natural	14	No	Ceiling Walls	15.0 15.0	Exhaust fans in ceiling
New Hampshire ---	14	14	No	Ceiling Walls	15.0 15.0	Exhaust fans
North Carolina----	Step down	Step up to 17	No	Ceiling Walls	7.3 1.5	Natural via windows
Pennsylvania -----	8	12 to 17	Yes	Ceiling Walls	15.5 15.5	Exhaust
Tennessee--------	Natural	14	No	Ceiling Walls	13.0 None	Winter, Positive pressure; Summer, Exhaust fans

6/ Due to variations in type of construction, R Values will be approximate for some tests.

7/ At day old--18-1/2 hr.; light decreased 15 minutes per wk. to meet at 15-1/2 hr. at longest day, then natural decrease until 13-1/2 hr.

8/ 13-1/2 hr. until natural increase takes light hours to 15-1/2 hr. in mid-June, then light held at 15-1/2 hr. until end of test.

TABLE 7.--Management, rations, laying house environment, and vaccination provided by tests, 1973-74
Continued

Test	Newcastle		Infectious bronchitis		Fowl Pox		Encephalo-myelitis		Coccidiosis control		Marek's Disease
	Type	Age (wk.)	Type	Age (wk.)	Type	Age (wk.)	Type	Age (wk.)	Type	Age (wk.)	Age
Central Canada	Spray Spray	1.5 19	Spray Spray	1.5 12	Wing web.	8	Water Water	8 15			1 day
Florida	Water Water Water	1,3,10 16,32 48,64	Water Water	1,3 10,16	Wing web.	8	None	--	Poly-stat	0-8	1 day
Minnesota	Water Water	5 14	Water Water	5 14	Wing web.	9	None	--	Amprol	0-20	1 day
Missouri Cage	Water Water Water	1 7 16	Water Water Water	1 7 16	None	--	None	--	Poly-stat	0-11	1 day
Missouri Floor	Water Water Water	1 4 10	Water Water Water	1 4 10	None	--	None	--	Poly-stat	0-8	1 day
New Hamp-shire	Dust Dust	2 20	Dust Dust	2 20	None	--	None	--	Cocci-Vac	1	1 day
North Carolina	Occular Water Water +Every 90 days	1 5 16	Occular Water	1 5	Wing web.	12	Water	14	None (cages) 6 Spcs. Cocci	-- 1	1 day
Pennsyl-vania	Water Water Water	4 8 16	Water Water Water	4 8 16	Wing web.	8	None	--	Amprol	0-20	1 day
Tennessee	Occular Occular Occular	1 day 10 20	Occular Occular Occular	1 day 10 20	Wing web.	10	None	--	Amprol	0-20	1 day

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